THE RELATIONSHIP BETWEEN DYSFUNCTIONAL SCHEMATA AND OUTCOMES FROM A PAIN MANAGEMENT PROGRAMME

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Doctor of Clinical Psychology
University of Edinburgh 2001

Declaration

"This thesis has been composed by myself and the work contained herein is my own"

Signed

Acknowledgements

I would like to thanks my supervisors, Professor Mick Power and Dr Aileen Thomson, for all the help, advice and encouragement they have given me.

I would also like to thank the staff at the Astley Ainslie Hospital for taking the time to complete the ratings of dysfunctional schemata and predictions of patients' outcomes and for offering me their advice and encouragement. I would particularly like to thank Norma Martin, Irene Morgan and Vicki Graheme, who as psychology assistants in the department, were very helpful in ensuring as much data was collected from the patients as possible.

The patients who attended the pain management programme and who took part in the study deserve special thanks. They were already greatly burdened with questionnaires from the clinical team and their generosity in giving the extra time it took to complete the measures that were required for this study must be especially acknowledged.

My wife and son showed their usual limitless patience, support, encouragement and tolerance and for this I give them my deepest thanks.

ABSTRACT

Psychologists involved in the treatment of chronic pain have increasingly emphasised the importance of cognitive factors in the development and maintenance of chronic pain (Turk and Rudy, 1992). Most pain management programmes (PMP's) incorporate a cognitive-behavioural component that, for example, teaches patients to identify thoughts the might lower mood, exacerbate their pain or interfere with their ability to engage in rehabilitative behaviours. These treatment elements are derived from the cognitive model of depression (Beck, 1967), which states that depressed mood is maintained by negative automatic thoughts that arise out of the patient's dysfunctional schemata. Schemata are cognitive structures that organise our beliefs, attitudes and assumptions, and help the individual to construe themselves and their world. Whilst there has been some research suggesting that dysfunctional schemata (those thought to be associated with poor psychological adjustment) can interfere with outcome in cognitive-behavioural therapy for depression (Jarrett, Eaves, Granneman and Rush, 1991) no similar research has been conducted examining their influence on outcome from a PMP.

In this study, 66 patients, who were attending six consecutive pain management groups, were asked to complete two measures of dysfunctional schemata (the Dysfunctional Attitudes Scale, Weissman, 1979 and the Young Schema Questionnaire - Short Form, Young and Brown, 1999). These measures were supplemented by two sets of informant ratings (provided by a close friend or relative and by the psychologist leading the PMP) of the patient's schemata. Outcome measures used to assess the effectiveness of the PMP included current pain intensity,

self-reported mood disturbance, self-efficacy, readiness to engage in pain management, disability, and physiotherapist ratings of functional ability. These were collected at the beginning and at the end of treatment. The number of significant associations between the measures of dysfunctional schemata and patient outcomes (the difference between pre and post-treatment scores) were few and were often in the direction opposite to that predicted. Various substantive and methodological reasons were examined in an attempt to explain why the study hypothesis was not upheld.

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CHAPTER 1.

INTRODUCTION

1.1 The problem of chronic pain.

Chronic pain is a very widespread problem. A recent World Health Organisation survey (Gureje, Von Korff, Simon, & Grate, 1998) conducted across five continents, reported that 22 per cent of the nearly 26,000 respondents who were surveyed reported that they had suffered persistent pain sometime over the last year. A recent review of the prevalence of 'chronic benign pain' (which is pain of unknown organic explanation, also known as 'idiopathic pain'; 'pain of unknown physiological origin'; and 'somatoform pain') found a median prevalence, across 15 studies, of fifteen per cent (Verhaak, Kerssens, Dekker, Sorbi and Bensing, 1998). Many of the patients in these studies may have, at some time or another, been identified by their physicians as suffering from some form of underlying physiological pathology.

Such problems, as well as being widespread and causing a great deal of distress and disruption to the lives of sufferers, are also extremely costly. One study (Maniadkis and Gray, 2000) of the economic costs of back pain (the most common site for chronic benign pain) to the economy of the United Kingdom produced some startling figures. The direct costs of back pain (comprising hospital visits, private treatments, prescription drugs, and medical investigations) were calculated at £1632 million in the year of 1998. This figure, however, was dwarfed by total costs, which took account of such things as informal care and lost production, which they estimated

produced an annual bill of £10668 million. Clearly, chronic benign pain is worthy of attention.

There have been numerous attempts to produce a classification system for describing the chronic pain population, but this has been hampered by confusion over the extent to which symptom variation between patients can be attributed to specific pathological processes. The purposes of producing such a diagnostic system is that it should indicate which groups are appropriate for which forms of treatment approaches and it should also predict outcomes from treatment for different kinds of chronic pain patients. The most extensive classification system to date is that produced by the International Association for the Study of Pain (IASP, 1986). This is now in its second edition (Merskey and Bogduk, 1994) and identifies over 600 pain syndromes. However, even this elaborate system has been criticised for focusing on pain site as the primary organising factor as it is felt that such an approach is likely to lead to heterogeneous groupings of patients. This concern about groups of pain patients being treated as homogeneous runs throughout the modern literature on pain. However, even the most modern of books is organised by using pain site as a classification system. Typically, such books will have chapters headed, 'phantom limb pain', 'migraine and headache', 'neck pain', 'low back pain', and so forth (see, Crombie, Croft, Linton, LeResche and von Korf, 1999, as an example).

Pain has been defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (The International Association for the Study of Pain, Subcommittee on Taxonomy, 1986).

Because pain is a sensory and emotional experience, it is, essentially, a subjective experience. Furthermore, this truism, along with the fact that tissue damage does not always have to be present for pain to be felt, ensures that any measurement and classification system is likely to be problematic. Furthermore, it is widely accepted that chronic pain is a multi-dimensional phenomenon, comprising sensory experiences, associated suffering or emotional distress and a variety of 'pain behaviours' (Crombie and Davies, 1999).

1.2 Models of chronic pain

The following sections go on to describe the various models that have been used to attempt to understand chronic pain. Because of the variation across pain patients, in terms of their underlying pathology, their personal histories and their psychological make-up, these models may provide explanations for some groups but not for all. Therefore, it is not intended that these models be seen as competing with one another (although when viewed historically this can be seen as often having been the case). Rather each approach may prove informative regarding the experiences of particular groups of pain patients. In rough terms, these models can be divided into those that centre around physiological, behavioural (including learning theory), cognitive, characterological, and social explanations.

1.2.1 Physiological models

Early models of pain regarded it as a purely physiological phenomenon, with pain being an automatic response to a painful stimulus. Descartes suggested that there was a direct pathway from this stimulus to specific areas of the brain that registered the

painful sensation. These ideas were further developed by Von Frey (1895) who postulated specific sensory receptors for different sensations, such as heat, touch and pain. Then, in 1920, Goldschneider developed a model of pain called the 'pattern theory' that suggested that specific patterns of nerve impulses produced different types of sensations, including pain. These early physiological models all have similar characteristics in that they exclude psychological influences on pain and see pain as an automatic response to physical stimulation.

It was the development of the 'gate control theory of pain' (GCT) by Melzack and Wall (1965) that central nervous system processes were made central to the understanding of pain. The gate control theory integrates psychological and physiological processes through the means of a 'gate'. This gate mechanism is thought to comprise a group of cells located in the dorsal horns of the spinal column. This mechanism is hypothesised to receive input from the site of injury through peripheral nerve fibres that synapse here. Most importantly, the 'gate' also receives input from the brain via descending neural pathways. These 'top-down' inputs contain information about the organism's current behaviour (including attention), emotional state (for example, the level of anxiety), and past experiences (for example, memories of pain and injury) and are thought to act in both an excitatory and inhibitory fashion. The gating mechanism is believed to sum up these inputs with the strength of the summated signal determining whether or not this is transmitted past the gate and into areas of the brain which would register a painful sensation. Whilst the gate control theory has had a huge influence on pain research it has been criticised for being too general, and fails to specify with sufficient precision the

interactions that it proposes take place (Price, 1988). Another criticism is that it has proven difficult to identify a physiological structure that acts in the gate-like fashion that is proposed by the model (Nathan and Rudge, 1974). Others, like Sunderland (1978), argue that the theory fails to account for certain conditions, such as causalgia (a severe burning pain). The model has undergone a number of revisions (Melzack, 1993; Melzack and Wall, 1989) in an attempt to tackle some of these criticisms. Regardless of whatever problems remain with the model, it is still viewed as being the most influential working theory that is used by modern pain researchers (Skevington, 1995).

Recent developments in neurophysiology have extended our understanding of biological processes in chronic pain. Essentially these physiological models have examined long-term changes in the nervous system. These studies have demonstrated that peripheral and central nerve functioning is 'plastic', and can be altered as a consequence of repeated environmental exposure. In one of the earliest demonstrations of neurological plasticity Dubner and Ruda (1992) showed that, immediately following an injury, the surrounding area can become highly sensitive to stimuli that were previously innocuous (such as mild variations in touch and temperature). The hypothesised physiological mechanisms in this case are thought to be excitatory toxic effects of amino acids altering spinal cord function. In a review of neuropathic pain Woolf and Mannion (1999) distinguish between spontaneous (or stimulus independent) pain and pain hypersensitivity resulting from damage to, or changes within, neural pathways.

Other models, however, have focused exclusively on psychological factors.

1.2.2 Behavioural models

Perhaps the most well known behavioural model is the one proposed by Fordyce (1976). According to Fordyce, pain can not be observed directly and the only information we can gain from another person about their pain is that which they communicate to us. These communications can either be verbal or non-verbal. Furthermore, like any other form of behaviour they are capable of eliciting responses that may in turn be reinforcing and increase the likelihood of the behaviour being produced again. Clearly, such a theory provides a set of processes that could theoretically be capable of causing pain behaviours to become long-lived. More detail about the theorised processes involved in this model is given in Fordye (1982).

According to this model pain behaviour can occur for one of two reasons. The first is a response to a nociceptive stimulus, which Fordyce (1982) suggests is a respondent or reflexive behaviour. The alternative is that pain behaviour can occur because of conditioning effects. He suggests that in the traditional case, pain behaviours originate as a consequence of injury. However, these if these pain behaviours persist, they do so in an environment which contains conditioning effects. Therefore, pain behaviours may occur long past the time taken for any injury to heal.

Fordyce (1982) cites a number of studies as evidence for these processes. In one study Fordyce, Cauldwell and Hongadarom (1979) measured the amount of effort that patients with chronic pain could tolerate. This experiment had two conditions.

Both of the conditions involved patients turning the wheel of the exercise bike in order to keep a bulb, which was suspended above their heads, lit. In the first condition the subjects were denied feedback on the effort they were making as the apparatus was rigged in such a way as to constantly vary the effort required to keep the bulb lit. In the second condition, the apparatus was held constant, so that the patients were given accurate feedback about the effort that they had expended. What was interesting about this experiment was that the subjects who were denied feedback were able to tolerate effort at much higher levels than were those who were given accurate feedback. Fordyce (1982) suggests that this experiment demonstrated that exercise 'tolerance' in chronic pain patients critically depends on factors other than some simple nociceptive feedback.

Other experiments that Fordyce (1982) cites to support his model include a study by Block, Kramer and Gaylor (1980) where the pain behaviours elicited by chronic pain patients in an interview situation were measured. The patients were divided into two groups. One group consisted of patients who reported that their spouses acted in supportive ways when they were in pain. The other group comprised patients who said their spouses were unsupportive. The experimental situation involved giving the patients (accurate) feedback on whether they were being observed by their spouses or a medical professional from behind a one-way mirror. At the mid-point of the interview the patients were asked to give a rating of their current level of pain. The results demonstrated a two-way interaction between patient group and whether their spouse or the health professional was observing. The pain ratings given by both groups of patients were similar when being observed by the health professional but

were significantly higher in the supportive spouse group when they were told that their spouse was observing. This study suggests that social feedback is important in determining what patients say about the severity of their pain. A study conducted by Cairns and Pasino (1977) further demonstrated that exercise performance and tolerance can be determined by social feedback. In this study, the performance of nine chronic pain patients on two separate tasks, riding an exercise bicycle and walking laps of a track, were measured. On both tasks, the patients' performance was either praised or responded to neutrally by the physical therapist accompanying them. Inspection of the patients' performance levels revealed that this was higher when their activity was being praised. All of these experiments suggest that pain behaviours can be systematically controlled by environmental influences.

Fordyce (1982) suggests that the process of reinforcement described above can easily explain a variety of behaviours that are typical of patients with chronic pain. For example, medication that is given on an 'as required' basis requires the patient to indicate suffering before the medication is given out. Fordyce (1982) argues that if the analgesic has a positively reinforcing value for the person then, in behavioural terms, a conditioning arrangement has been set up whereby the medication regime strengthens the probability that the person will indicate suffering and continue to ask for analgesia. A similar example can be seen when patients are encouraged to stop an activity when it becomes painful. Such instructions make rest contingent on pain behaviours. If this rest is reinforcing for the person, then a conditioning arrangement has been set up that may serve to strengthen pain behaviour. The studies by Block and colleagues (1980) and by Cairns and Pasino (1977) described earlier, illustrate

how the behaviour of family, friends and health professionals have the potential to increase and maintain pain behaviours. As well as positive reinforcement perpetuating pain behaviours, Fordyce (1982) argues that avoidance learning can also play a part in the amount of functional limitation displayed by patients with chronic pain. One example of this kind of learning has been termed 'secondary gain'. This is where patients learn that when they have pain (or emit pain behaviours) they avoid aversive events. Classic examples of such learned avoidance may include situations where pain behaviours allow difficult circumstances at work or in social and family relations to be avoided.

This model has been hugely influential in the development of the understanding and treatment of chronic pain. Many modern interventions with chronic pain patients contain elements of this behavioural model.

1.2.3 Cognitive models

Cognitive factors have been postulated to intervene in many ways in the development and maintenance of chronic pain states. The particular cognitive processes that have been examined have included pain perception (although this work has been more relevant to acute, rather than chronic pain), beliefs, appraisals, expectations, coping and memory. Turk and Rudy (1992) provide a review of cognitive factors in chronic pain. In this review they organise these factors into schema (actually labelled 'beliefs, appraisals and expectations'), cognitive processes, and cognitive content. However, an examination of these categories suggests a large degree of conceptual overlap and one major omission. The cognitive factors

contained in the category that they label 'beliefs, appraisals and expectations' are straightforward enough. This category includes beliefs about the seriousness of the injury and further vulnerability to harm, self-efficacy, and learned helplessness (however, it does not include beliefs about the appropriateness of self-management approaches). The category of cognitive processes contains sets of thinking distortions, errors, or biases that pain patients are thought to display. The list of cognitive distortions given by Turk and Rudy (1992) essentially comprises those suggested by Beck (1976) as playing a causal role in depression. However, Beck (1976) is very clear that these types of thinking errors spring from sets of beliefs (schema) that are established through early experiences. Consequently, it seems rather artificial to separate cognitive distortions from schema as Beck's theory suggests that the former spring from the latter. The final set of cognitive factors outlined by Turk and Rudy consisted of "..the ongoing thoughts and coping strategies used by chronic pain patients" (Turk and Rudy, 1992, p.110). Turk and Rudy (1992) suggest that these types of thoughts can be separated from the other two types because they are generated '*at the time of experiencing pain*' (my italics). However, included in this list of the types of thoughts are catastrophising and helplessness, both of which appear under the other two categories of thought types. This distinction, which appears to be made solely on the basis of the timing of these thoughts, does not seem a particularly valid one, particularly as these beliefs and thinking biases are portrayed in other parts of their review as stable characteristics of the pain patient's thought processes. Given these concerns about the validity of the categories of cognitive factors used by Turk and Rudy, this review this will keep all three sets together under the single heading of 'cognitive content'.

The major omission in Turk and Rudy's (1992) review is that research into cognitive factors that are, indisputably, distortions in cognitive processes, are absent. In particular, there is a substantial body of evidence examining biases in attentional and memory processes that are thought to affect the experiences of chronic pain patients in ways that are theorised as totally separate from the effects of the specifics of cognitive content. Therefore, this review of cognitive factors in chronic pain will cover just two categories. These will be labelled 'cognitive content' and 'cognitive processes', with the latter concerned with biases in attentional and memory processes.

Schema/Cognitive content

This perspective views pain patients, like everybody else, as processors of information. The processing of this information is guided, or biased, by the patient's beliefs, appraisals and expectancies. The sets of beliefs that are relevant to the patient's pain and disability concern those surrounding their pain, their ability to cope, their social supports, their underlying pathology, the medico-legal system, their work and their employer's attitudes. Cioffi (1991) argues that, when confronted with a new illness, patients will try to understand what is happening to them, how they will be affected by it, and the likely prognosis. He calls this process of trying to understand a 'meaning analysis'. As part of this analysis, patients will use their schema to see whether or not important parts of their old experiences can be matched up with the world that they find themselves in currently. In terms of the development of chronic pain, the first stage in this process would involve the individual

interpreting, labelling and acting upon the physical sensations (in this case, their pain) that they are experiencing. Once these sensations have been labelled as pain, then other belief structures (for example, 'what is causing this?', 'does this mean I am damaged?') would follow. From this process an elaborate mental model of the patient's physical state is built, and this model may then determine the patient's perception of their ability to cope and lead to the planning of further actions (Turk, Rudy and Salovey, 1986). The example cited by Turk and Rudy (1992) is of a patient who has a set of cognitive schema which suggests to them that they have a very serious condition, that impairment naturally follows from pain, and that activity undertaken when in pain is dangerous. They suggest that it is understandable and predictable that a pattern of rest, dependency, and avoidance of work and other activity may follow.

There are five sets of schema that have been most studied in relation to chronic pain. These are, self-efficacy, fear of (re-)injury, catastrophising, helplessness and readiness to accept a self-management approach to chronic pain. Each of these will be dealt with in turn.

Self-efficacy is defined as "...a personal conviction that that one can successfully execute a course of action to produce a certain outcome." (Turk and Rudy, 1992, p106). Bandura (1977) suggested that, along with motivation, self-efficacy beliefs determine which specific goal-directed behaviour is selected, how long this behaviour is persisted with, and whether or not an individual continues when faced with obstacles to achieving that goal. A number of studies have found that self-

efficacy beliefs play a part in the rehabilitation efforts made by pain patients (For a review see Turk and Rudy, 1991). An example of a study that employed a measure of self-efficacy beliefs is the one conducted by Council, Ahern, Follick and Kline (1988). These authors reported that, out of a suite of measures, self-efficacy ratings were the best predictor of the physical performance of back pain patients. The authors went on to suggest that these self-efficacy ratings were themselves determined by the extent to which patients anticipated that physical activity would lead to an increase in their pain and further disability (see below for more information on the relevance of fear avoidance and anxiety). These results have also been replicated in a more recent study (Buckelow, Murray, Hewett, Johnson and Huyser, 1994).

As well as appearing to be a stable finding, there is also some evidence from an impressive longitudinal study supporting the notion that these efficacy beliefs play a causal role in the well-being of patients with chronic pain. Keefe, Affleck, Lefebvre, Starr, Caldwell, and Tennen (1997) examined daily diaries from 53 patients with rheumatoid arthritis. Time lagged analyses revealed that self-efficacy scores on one day predicted pain intensity and mood ratings on the following day.

Fear of (re-)injury, or fear avoidance as it is sometimes called, is of great conceptual interest. Fordyce's behavioural model of chronic pain would suggest that if unpleasant activities are avoided then this behaviour will be maintained by a process of negative reinforcement involving the reduction of the patient's anxiety. Turk (1996) has suggested that this conditioned fear may generalise to a variety of

different situations, such as work, sexual activity and leisure. This avoidance often leads to a loss of mobility, muscle strength, and fitness (Bortz, 1984). This whole process is essentially self-defeating for the patient who avoids activities to reduce their pain. This is because the loss of physical condition increases the likelihood of pain resulting from muscle or ligament strain when an unfit body is asked to perform activities that it has become unused to performing.

The use of this concept in understanding chronic pain has been furthered by the recent parallel development of two self-report measures of this construct. The Pain Anxiety Symptoms Scale (PASS: McCracken, Zayfert and Gross, 1992) is a 53 item scale that seeks to measure fear of pain. Validation of the scale was conducted by a series of regression analyses where the ability of the scale to predict disability in chronic pain patients after controlling for anxiety, depression, and a measure of pain intensity. In each of these analyses, the PASS contributed significantly to variance in the disability score. A more recent study, using a series of step-wise regression analyses, found that various sub-scales of the PASS predicted pain severity, disability, pain complaints and help-seeking behaviours (McCracken, Gross, Aiken, and Carnrike, 1996).

The Tampa Scale for Kinesiophobia (TSK: Kori, Miller, and Todd, 1990) is a similar instrument. It contains 17 items that measure fear of physical movement because of a sense of vulnerability to painful injury or re-injury. Validation studies have shown that low back pain patients who score highly on the TSK are less likely to persist with a task that consisted of lifting a 5.5kg bag (Vlaeyen, Kole-Snijders, Boeren and

van Eek, 1995). Another study (Vlaeyan, Kole-Snijders, Rotteveel, Ruesink and Heuts, 1995) found that the TSK was significantly correlated with measures of disability, pain intensity, pain duration, and a self-report instrument that measured catastrophic thinking (see below for more detail on this concept). The same study also employed a regression analysis, which demonstrated that the TSK was a significant predictor of self-reported disability after pain duration was controlled for. Such findings raise the question as to whether these fears develop as a response to living with chronic back pain or whether they play a causal role in the development of chronicity. One interesting study suggests that the latter explanation is more likely. Klenerman, Slade, Stanley, Pennie, Reilly, Atchison, Troup and Rose, (1995) collected psychological and biomedical measures from a group of 300 patients with acute back pain. When these patients were followed up, they found that fear of pain measured at the time of assessment was the best predictor of continuing low back pain one year later. The implications of these findings for the necessity of early educational intervention in acute back pain are obvious.

Catastrophising is one of the cognitive biases or 'thinking errors' (along with 'arbitrary inference', 'selective abstraction', 'overgeneralisation', 'magnification/minimisation', 'personalising' and 'mind-reading') identified by Beck and his associates that are thought to maintain the negative beliefs and appraisals that underlie many psychological disorders (Beck, Rush, Shaw and Emery, 1979). It is defined as "dwelling on the worst possible outcome of a situation and overestimating the probability that it will occur" (Wells, 1997, p.8). Although there have been a number of investigations of these 'thinking errors' in the chronic pain population,

catastrophising has become to be regarded as the most important (Turk and Rudy, 1992). This is because, in this group, it has been found to be linked to depression (Lefebvre, 1981), disability (Smith, Follick, Ahern and Adams, 1986), and pain intensity (Flor and Turk, 1988) even when disease variables are controlled for. As with all of these cognitive variables, the direction of cause (from cognition to pain or vice versa) has been difficult to ascertain because of a lack of longitudinal studies. Turk and Rudy (1992) make the point that cognitive-behavioural treatment approaches target these cognitions because they view cognitions as causally related to pain chronicity. They go on to suggest that, if this theory is correct, the degree to which these cognitions are changed during treatment should be associated with variation in therapeutic outcome. Reassuringly, several studies have found that changes in cognition corresponded with changes in measures of pain, dysphoric mood, and disability (O'Leary, Shoor, Lorig & Holman, 1988; Parker, Smarr, Buesher, Philips, Frank, Beck, Anderson and Walker, 1989). However, longitudinal studies that show that catastrophising is linked to the development of chronic pain are still required.

Learned helplessness (Seligman, 1975) refers to a belief that no solutions are available to reduce the current experience of distress. With the inclusion of attribution theory, this concept was developed further into what was known as the reformulated helplessness theory (Abramson, Seligman and Teasdale, 1978). Hopelessness theory broadened these ideas further still by including beliefs about the extent to which aversive events are unavoidable and are predictive of future uncontrollable events (Abramson, Metalsky and Alloy, 1979). The theoretical

relevance of these ideas to an understanding of pain is that those in chronic pain may come to believe that the onset and the intensity of their pain is uncontrollable, likely to interfere with the whole of their lives, and that these problems are likely to be unending. Some research has suggested that this attributional style ia a cause of depression (Metalsky & Joiner, 1992). However, others contend that the strength of these beliefs is more likely to be a consequence, rather than a cause, of depression (Brewin, 1986). Skevington (1995) reviewed the evidence for the role of helplessness beliefs as the cause of mood disorder in chronic pain patients and concluded that this could best be described as limited and qualified.

The final set of schematic processes that have been investigated in chronic pain are various beliefs about the appropriateness of a self-management approach. Such beliefs may include a strong opinion that only medical intervention can help or that self-management is likely to be ineffective in treating their pain. These sets of beliefs have been integrated into a model that is thought to reflect the stages that individuals go through in changing their behaviour. The transtheoretical model of behaviour change (Prochaska and DiClemente, 1984) proposes that individuals progress through five stages when changing their behaviour. These stages are generally labelled, precontemplation (the stage where the individual has little interest in changing their behaviour), contemplation (the point when the individual reports interest in change), preparation (when the individual actively considers how to change), action (the stage when individuals start to change their behaviour) and maintenance (the stage where the individual works to maintain the change in their behaviour). This model proposes that for behaviour change to be successful, the

content of interventions should be matched to the target person's stage in the behavioural change process. Failure to do so, it is argued, risks the intervention failing.

A self-report measure of these stages of change cognitions has been developed for use in chronic pain populations. The Pain Stages of Change Questionnaire (PSOCQ: Kerns, Rosenberg, Jamison, Caudill and Haythornwhite, 1997) was developed to measure four of the above five stages. The reason that there are only four, rather than five stages, is that the results of a confirmatory factor analysis suggested that the stages labelled 'preparation' and 'contemplation could not be separated empirically and the PSOCQ therefore combines these into a single sub-scale. These four stages are represented as sub-scales of the PCOSQ. Validation of the PSOCQ was conducted in two stages. The first examined the correlation matrix of four sub-scales. This revealed that the pre-contemplation sub-scale was correlated inversely with the other three sub-scales, whilst the contemplation, change, and maintenance sub-scales all correlated positively with each other. These results are in line with the theoretical model. External validation of the scale was conducted by examining the relationship between the four sub-scales and a variety of criterion measures. These criterion measures included two sub-scales from the Survey of Pain Attitudes (Jensen, Turner, Romano and Lawler, 1994), one of which concerned the pain patient's belief in a medical cure whilst the other addressed the extent to which patients believed they had control over their pain. The pattern of correlation coefficients was broadly supportive of the PSOCQ model, with, for example, pre-contemplation being related positively to a belief in a medical cure and negatively with the patients' belief that

they had control over their pain. When measures of active and passive coping were examined in relation to the PSOCQ sub-scales, the pattern of correlation coefficients was also in the directions predicted by the model. Essentially, active coping showed an inverse relationship to pre-contemplation and was related positively to the other sub-scales, whilst the relationships between passive coping and the PSOCQ sub-scales were in opposite directions. The strongest test of the utility of this concept would naturally be whether or not it predicted patient responses to a self-management treatment approach. This test was conducted in a recent paper. Kerns and Rosenberg (2000) used the PSOCQ responses from chronic pain patients to predict outcome from a cognitive behavioural group therapy programme that emphasised a self-management approach. The results of this analysis can be described as mixed. Whilst pre-treatment PSOCQ scores did not predict treatment changes in a variety of outcomes (including, pain severity, disability, pain behaviours and mood ratings) changes in PSOCQ scores were related to some treatment effects. Those patients whose pre-contemplation scores increased during the group programme also showed increases in pain severity, disability and depression scores. Furthermore, those patients whose action and maintenance scores increased following the group treatment showed reductions in depression ratings. Another interesting finding was that the PSOCQ score profiles predicted which patients dropped out of treatment. Although many of the other correlation coefficients failed to reach statistical significance, most of these were in the direction predicted by the theory. Perhaps, with a larger sample size this interesting approach would receive more unequivocal support.

Processes

Cognitive processes, in this context, refer to the manipulation of information. The specific processes that have been studied in relation to chronic pain have included attention and memory. Researchers have been interested in the ways in which these systems may be operating with a variety of biases, and the role that these may potentially have in maintaining chronic pain and accompanying low mood. This work has followed on from a more general investigation of information processing biases in clinical disorders, which has become increasingly popular (Williams, Watts, MacLeod and Mathews, 1997).

As regards attention, investigators have sought to establish whether patients with chronic pain syndromes process pain-related information differently from normal controls. The reasoning behind such an approach is that such biases may increase patient distress and may be responsible for maintaining the pain experience. This reasoning is in turn based on the oft-repeated finding that attending to painful stimuli (most often in laboratory based tasks) increases pain intensity and lowers pain tolerance thresholds. Indeed, cognitive coping strategies that involve distraction have been shown in one meta-analysis (Fernandez and Turk, 1989) to enhance pain tolerance.

The most commonly used paradigm to investigate attentional biases is a modified form of the Stroop colour-naming task (Stroop, 1935). The theory behind this method is that the emotional content of some words (in the case of this clinical group, the words would be related to pain in some way) would interfere with the

colour-naming task, causing a greater number of errors and longer response latencies. Using this paradigm, Pearce and Morley (1989) found that chronic pain patients demonstrated greater interference on pain-related sensory and affective words when compared to pain-free controls. However, other researchers have failed to find attentional biases (Herbert, 1992), whilst those that have replicated the Pearce and Morley study have suggested that longer response latencies may simply be a consequence of the high levels of depression among pain patients (Boissevan, 1994). Pincus, Fraser and Pearce (1998), in a carefully conducted set of experiments, demonstrated that attentional biases in chronic pain patients arise out of anxious and depressed mood, and could not simply be ascribed to their pain patient status.

The evidence for memory biases in chronic pain patients, on the other hand, is much stronger and less equivocal. This work is based on the theoretical understanding of the role of memory in depression (Bower, 1981; Teasdale, 1983), and is derived from 'spreading activation theory' (Collins and Loftus, 1975). This theory proposes that emotional states are located in memory on what have been described as emotion 'nodes'. These nodes, when they are presented with the appropriate stimuli, are activated, causing memories to enter conscious awareness. Work with clinically depressed individuals, and with normal subjects in whom depressed mood has been induced, has shown that low mood is associated with a bias for recalling negative material and/or an opposing bias for reduced recall of positive material. These processes are known as 'mood state dependent recall' (Bower, 1981). Becks's cognitive theory of depression (Beck, 1976; Beck, et al., 1979) places great emphasis on the role of recurrent negative thinking as a cause of depression. These

experimental findings show one route by which the predominance of negative (or lack of positive) memories may occur. In a similar vein, Pearce, Isherwood, Hrouda, Richardon, Erskine and Skinner (1990), proposed that pain patients have a recall bias for pain related material. Using a mixed list of pain, negative and neutral words, Pearce and her colleagues found that, at both immediate and delayed recall, pain patients recalled more pain-related words and fewer negative and neutral words than did normal controls. Other researchers have found similar results (e.g. Wright and Morley, 1995). Importantly, these biases have been reported even when patients' mood state has been controlled for (Edwards, Pearce, Collett and Pugh, 1992). Researchers have suggested that these memory biases are theoretically important in understanding chronicity as they may lower mood (Pincus, Pearce, and McClelland, 1995), heighten pain intensity (Pincus, Griffith, Pearce Isenberg, 1996) and increase an individual's sense of vulnerability. An interesting recent paper (Pincus and Newman, 2001) demonstrated the potential role of this memory bias in determining health care utilisation. This study found an association between the degree of an individual's pain-related recall bias and the number of referrals to external specialists that had been made by their general practitioner.

This section has made it clear that patients who have chronic pain differ from others in terms of their beliefs and in how they process pain-related information. The theoretical rationale behind these studies suggests that certain patterns of thinking may help to maintain the chronic pain state. Interventions developed from these types of studies attempt to alter these patterns of thinking, with the aim of reducing pain or

bolstering the coping resources of chronic pain patients. These interventions will be reviewed later (see section 1.3).

1.2.4 Characterological models

There is a longstanding tradition of employing personality concepts in the understanding of chronic pain. The history of this line of research can be traced to early psychodynamic formulations that viewed pain as arising out of early developmental experiences. Indeed, four of Freud's female patients had pain as a prominent symptom. Breuer and Freud (1893/1974) proposed that unexplained pains could be understood as a hysterical reaction on the part of the patient. Such reactions, they claimed, were best understood as the conversion of unpleasant affect into bodily pain, with the exact choice of symptom (or site of pain) being determined by precipitating psychological events that have a symbolic meaning for the patient. Since Freud's writings, many other psychoanalytically oriented theorists have proposed dynamic explanations for such phenomena as sympathetic labour pains to phantom limb pains (see Merskey, 2000, for a review).

Since that time there have been repeated attempts to define a 'pain-prone', or 'migraine-prone' personality. Overall, however, these attempts have met with little success (Gatchel and Weisenberg, 2000) and have been extensively criticised by some authors who complain that viewing pain patients (or groups of pain patients) as broadly homogeneous is an approach that is doomed to failure (Gatchel, 1991).

The majority of the subsequent work on the role of personality in chronic pain has been conducted by investigators based in the United States and has used the Minnesota Multiphasic Personality Inventory (MMPI: McKinley and Hathaway, 1940). The MMPI is a 566-item self-report test that was developed as an aid to help in the diagnosis of psychiatric disorder. The test is an interesting one in that the items were chosen from a larger pool of items, solely on the empirical basis of whether or not they distinguished groups of individuals with different psychiatric disorders. It consists of 10 clinical scales alongside 4 validity scales (these latter scales, for example, assess the extent to which an individual tries to present an overly positive image or tries to 'fake' their answers). The clinical scales are thought to represent a mixture of states (or symptoms) and traits (Trimboli and Kilgore, 1983) and the original authors recommended interpreting the profile of scores across the scales, rather than single scale scores. The two commonest patterns of scores that researchers have reported finding in patients with chronic pain are 'the neurotic triad' and the 'conversion valley' (see Robinson, 2000, for a review of MMPI findings in chronic pain). The 'neurotic triad' consists of elevated scores on the following scales; 'Hypochondriasis', 'Depression', and 'Hysteria'. Individuals who show this pattern have high levels of somatic complaints and depressive feelings, and are hypothesised to have conflicted feelings about dependency. The 'conversion valley' profile (Graham, 1993), which has perhaps been found more consistently among chronic pain patients than any other profile, consists of elevated scores on 'Hypochondriasis' and 'Hysteria', with comparatively low scores for 'Depression'. Hanvik (1951) summarised the prevailing opinion about the role that the 'conversion valley' profile played in pain patient's self-concept, suggesting that they would profile describe

themselves thus: "I have numerous bodily complaints, but I am relatively unworried, not depressed" (p. 351). Essentially, this approach emphasises somatic preoccupation as the major factor in chronic pain.

There has been a vast body of work over the years that has attempted to use these profiles to distinguish between 'organic' and 'functional' pain patients. However, the results of these studies can best be described as mixed. Furthermore, in the light of the gate-control theory of pain and more recent biopsychosocial models, the attempted distinction has been seen as not very meaningful (Keller and Butcher, 1991). This type of work has also often been criticised for positing a causal role for these profiles, when these observed patterns could simply be one outcome following years of living with a painful condition (Robinson, 2000).

Several, more useful, studies have given the MMPI a wider role. One such study examined whether certain profiles predicted variations in treatment outcomes (this will be examined later, see section 1.4). Another type of study has specifically addressed the criticism that differences in MMPI profiles may simply be the result of living for years with a painful condition and have employed the MMPI in longitudinal research that has charted the development of chronic pain. One study followed 3020 aerospace company employees for a period of 4 years (Bigos, Battie, Spengler, Fischer, Fordyce, Hanson, Nachemson and Wortley, 1991) and found that the 'Hysteria' sub-scale was one of the prime variables that predicted the 279 employees who reported back problems. Studies such as this reflect the usefulness of

personality concepts in understanding chronic pain. However, the MMPI is not the only personality measure to have been employed with chronic pain patients.

Whilst the MMPI focuses on personality structures that can be viewed as pathological, other instruments, that measure what may be termed 'normal' personality structures, have also been used in the study of chronic pain. A number of studies, for example, have made use of the personality concept of Neuroticism (usually using the Eysenck Personality Questionnaire, EPQ: Eysenck and Eysenck, 1975). Some longitudinal studies using the EPQ have found that Neuroticism predicts the development of severe neck pain (Pietri-Taleb, Riihimäki, Viikari-Juntura and Lindström, 1994) and new onset of migraine headache (Breslau, Chilcoat and Andreski, 1996). Studies such as these suggest that the proneness to distress that neuroticism represents can contribute to physiological changes or lifestyle habits that are linked with disease progression.

Current consensus in personality theory has suggested that there are five major personality traits (known as the Big-Five personality theory, McCrae and Costa, 1987), consisting of Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience. Wade and Price (2000) have postulated roles for all five of the Big-Five personality factors in the treatment of chronic pain. They suggest, for example, that Openness to Experience may be relevant, in that patients who score highly on this trait may be more willing to try different approaches to their chronic pain than those whose Openness score is low. Similarly, they suggest that high scores on the Agreeableness trait may make the formation of therapeutic

alliance easier and that those who score highly on Conscientiousness are more likely than those with low scores to complete their therapeutic homework assignments. These are interesting speculations as they posit roles for personality theory in chronic pain rehabilitation and, as such, show a departure from existing research that has tended to focus on personality having a role in the psychogenesis and maintenance of chronic pain. Unfortunately, no empirical work has been completed using this theoretical orientation.

Apart from the work on how personality may affect treatment outcome, the remaining research thread in the personality and chronic pain field involves the impact of personality disorder. Personality disorder suggests that " personality traits are inflexible and maladaptive and cause significant functional impairment or subjective distress" (American Psychiatric Association, 1994). They are defined as "an enduring pattern of inner experiences and behaviour that deviates markedly from the individual's culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time and leads to distress or impairment" (American Psychiatric Association, 1994). The different types of personality disorder are laid out in Axis II of the DSM IV and fall within three clusters. 'Cluster A' comprises of paranoid personality disorder, schizoid personality disorder, and schizotypal personality disorder. 'Cluster B' contains antisocial personality disorder, borderline personality disorder, histrionic personality disorder, and narcissistic personality disorder. Whilst, 'Cluster C' consists of avoidant personality disorder, dependent personality disorder, and obsessive-compulsive personality disorder. There also exists a final type, known as personality disorder not otherwise specified. Although

numerous researchers and clinicians have investigated the personality characteristics of chronic pain patients, few have examined the prevalence of personality disorders among such patients.

Personality disorders are notoriously difficult to diagnose. These difficulties arise from the frequently found comorbidity (Links, Heslegrave, & Villella, 1998) between the disorders found in Axis I (the clinical disorders of anxiety, depression and schizophrenia) and Axis II (personality disorders) of the DSM IV (American Psychiatric Association, 1994). The picture is further complicated by poor inter-diagnostic reliability between clinicians (Holdwick, Hilsenroth, Castlebury, & Blais, 1998). However, even with these diagnostic problems, the evidence is fairly clear that personality disorder is fairly prevalent among chronic pain patients.

Weisberg (2000) reviewed the results of seven studies that had used a variety of diagnostic methodologies to examine the prevalence of personality disorders among chronic pain patients. This review found high rates, varying between 31 and 64 per cent, and much higher than that found in the general population. Prevalence rates of the personality disorders from Cluster A were generally low, although one study did report that 33 per cent of patients met the criteria for diagnosis of paranoid personality disorder (Polatin, Kinney, Gatchel, Lillo and Mayer, 1993). The personality disorders from Cluster B were more prevalent, with prevalence rates for the diagnosis of 'histrionic' and 'narcissistic' personality disorder often being over 10 per cent. Finally, four out of the five studies that had examined 'dependent' personality disorder found prevalence rates greater than 10 per cent.

This kind of information is useful, not only in identifying psychological need in pain patients, but because some authors have suggested that these kinds of personality factors are "one of the most challenging tasks for pain clinicians" (Weisberg and Keefe, 1999, p.56). For example, it has been suggested that patients with borderline personality disorders make more demands on clinical staff and demand immediate and specialised attention (Gatchel, 2000). As the review by Weisberg (2000) suggested that personality disorders are very prevalent among pain patients (in the United States, at least), this then raises the question about the extent to which these problems influence these patients' treatment.

1.3 Treatment of Chronic Pain

Aside from anaesthesiology led pain clinics and orthopaedic surgery, most of the current treatments offered to chronic pain patients involve applying cognitive-behavioural methods to address those factors (described above) that are thought to contribute to the maintenance of the pain state and accompanying illness behaviours. These treatment packages are often multi-disciplinary (usually involving, various combinations of psychologists, physiotherapists, nursing staff, occupational therapists and anaesthetists), usually conducted (in Britain, at least) on an out-patient basis, and can be presented either to patients individually or in groups (see Pearce and Erskine, 1993, for a comprehensive description). Such treatments employ both operant and cognitive methods. The group programme is thought by many to have advantages, due to the special therapeutic factors that groups generate (see Yalom,

1986), over individual treatment. The content of a typical group programme is described in Williams and Erskine (1995) and the major features are given below.

Education

Patients are taught about the complexities of the pain experience with a major focus on challenging beliefs that pain is always a sign of injury. Such an understanding is necessary for patients to be able to engage fully with the physical therapy aspects of the programme. Patients will also be taught about the beneficial effects of exercise on their joints (through improving the flow of synovial fluid) and how exercise will also help to improve the condition of their muscles. Some time will also be spent on raising awareness of the effects of chronic pain on the patients' lives. Such an approach helps to broaden the focus of treatment away from a narrow concern with pain intensity and suffering and on to wider aspects of the patients' problems.

Improving physical condition

Multi-disciplinary pain-management programmes almost always contain a physical therapy regime that is comprised of a graded series of simple exercises. These exercises will be started from an easily achievable baseline that the patient can manage without an accompanying increase in the intensity if their pain. Patients will be encouraged to practice these exercises regularly and to gradually increase the number of repetitions, or the range of movement involved (a process known as pacing). Regaining fitness is believed to improve confidence and self-efficacy beliefs, alongside the intrinsic benefits of muscle strength and joint mobility. Importantly, the patient is encouraged to perform these exercises and activities at the

planned level, regardless of how well, or unwell, they are feeling (exceptions are made for serious pain flare-ups).

Recovery of activities

This same 'pacing' approach will be taken with the physical aspects of activities involved in daily living (for example, sitting, standing, using a keyboard, and so on). The particular activities will usually be guided by short and long-term goals set within the areas of work, leisure, domestic activity and relationships. Patients will set homework tasks that are negotiated with staff, who will (often with the help of other patients) also help the patient to recognise obstacles that may get in the way of attaining these goals. Problems with these tasks will often produce material for the cognitive work (see below). There is clearly the potential for these goals to be undermined by over-solicitous family members or friends, who may be often used to doing many of these activities for the patient. Therefore, it is widely regarded as important to involve these family or friends, who may have difficulty in understanding the programmes aims and methods. It is also recognised that asking family and friends to reduce the help that they give may result in them losing a valued role in the patient's life.

Relaxation and sleep management

Relaxation skills are taught widely in these programmes. This is for two important reasons. Firstly, it is recognised that muscular tension is prevalent among chronic pain patients and that relaxation is useful to tackle general psychophysiological arousal. Secondly, among some groups of patients, muscular tension is thought to

contribute to pain intensity and that relaxation that lowers this tension may have analgesic properties. However, it is important to emphasise that relaxation is not a powerful analgesic, in case a feeling of failure results when patients' high expectations are not met. Pain patients often have difficulty sleeping, therefore, teaching sleep hygiene practices (such as relaxing before bed-time, not napping in the daytime, having an established night-time routine, and so on) can be helpful to patients (Morin, Kowatch and Wade, 1989).

Medication reduction

Many chronic pain sufferers are prescribed opiates by their physician in an attempt to offer some form of help to patients who are often very demanding. However, these drugs rarely help (Brena and Sanders, 1991), and often have many side effects that, in turn, contribute to patient's feelings of being unwell. A further problem is that opiate overuse may be maintained by the operant processes that were described above. Therefore, many pain-management programmes give information on the effects and side effects and also offer advice on medication reduction. A major part of this advice is to change patterns of medication usage so that it is time rather than pain-contingent.

Improving mood and confidence

This usually involves cognitive techniques to tackle patients' misconceptions regarding pain and the types of 'thinking errors' that were described earlier. Thought diaries and other standard forms of eliciting, elaborating and challenging negative cognitions are employed. Catastrophising is a common thinking error that is tackled

in such programmes. For example, patients will often report experiencing a pain in a new site, or an increase in pain intensity, and imagine that this signals further decline or a worsening of an underlying pathology. A great deal of anxiety and a sense of hopelessness about the future will often accompany such catastrophic thoughts. In such a case, patients will usually be encouraged to examine their previous experiences of variations in their pain and asked to reflect on what the usual outcome was. Often this process will reveal that such changes in pain are common and often resolve themselves in a matter of days. Patients are then encouraged to generate a thought that contains a more realistic view, to note this down, and then to substitute this thought for the catastrophic one that they generally employed in the past.

Any successes from the rest of the programme (improving fitness, increases in activity, a greater control over medication, and so on) are praised. This helps to highlight success, challenge feelings of helplessness, improve self-efficacy beliefs and ultimately maintain the patient's motivation to continue with the programme.

Generalisation and skill maintenance

Pain management programmes usually encourage patients to consider any long-term goals that they might have and the steps that will be required to achieve them. Patients are encouraged to consider the possible obstacles in the way of achieving their goals and to detail the steps that need to be taken, bearing in mind the pacing principles that they have been taught in other parts of the programme. This process helps the patient to generalise the lessons learned to wider aspects of their lives and provides a detailed plan for continuing to practice the skills that they have learned.

Relapses and pain flare-ups are discussed and patients are encouraged to develop a written plan detailing how they would respond to these eventualities.

1.4 Outcome studies of pain management programmes

Rather than review a series of studies of varying methodological quality, this review will focus on the analysis and results of a recent meta-analysis that examined randomised controlled trials (RCT's) of cognitive behaviour therapy (CBT) and behavioural treatments for chronic pain. Morley, Eccleston and Williams (2000) found 25 RCT's that had compared CBT or behavioural therapy (without the cognitive component) to control groups of patients receiving either no treatment or an active (non CBT) treatment. Outcomes from these RCT's were measured in a variety of ways, reflecting the multiple dimensions of chronic pain. These outcomes included pain experience, mood/affect, cognitive coping and appraisal, pain behaviour, biology/physical fitness, social role functioning, and use of health care systems. Compared with no treatment controls, CBT and behavioural treatments produced significant gains across all measurement categories, with an average effect size (as measured by Cohen's *g*) of 0.5. Compared to active treatment controls, CBT was more effective in the domains of pain experience, cognitive coping and appraisal, and behavioural expressions of pain. Interestingly, particularly as CBT was developed as a treatment for mood disorders, CBT treatments were no more effective than other active controls in terms of its effects on mood/affect and social functioning. When behavioural treatments (without the cognitive elements) were compared against active controls, they only showed reliable benefits for expressions

of pain behaviour and social role functioning. Unfortunately, the meta-analysis did not make direct comparisons of CBT and behavioural treatments of chronic pain, and the relatively poor performance of the latter may be attributable to the fact that there were fewer studies on which these estimates were based.

1.4.1 Variations in outcome from pain management

Morley and his colleagues reported an average moderate effect of pain management. There was considerable variability around this average effect (the distribution was described as heterogeneous) which was not explained well by study characteristics. The variability in effectiveness of cognitive-behavioural programmes for treating chronic pain raises the question of whether there are some groups of patients that do well and others who do poorly. Morley and his colleagues (2000), in their meta-analysis, excluded headache patients on the grounds that, for pain reduction at least, they might be expected to show greater benefits from treatment than other patients. They go further in claiming that for the rest of the heterogeneous chronic pain patients "neither diagnosis, nor site of pain, nor medical findings are an apparent major source of variance in any of the targets for treatment" (p. 2). Although these medico-physical factors appear to be unrelated to outcome, there have been some findings suggesting that psychosocial variables may predict who does better or worse from pain management.

Kerns and his colleagues (2000), using the pain stages of change model, reported variations in outcome, in so much as patients with certain profiles (high pre-contemplation and low contemplation scores) were more likely to drop out of

treatment. Another study, employing models from the psychotherapy literature, suggested that repression of emotional experience could interfere with outcomes from pain-management (Burns, 2000). The author created four groups by splitting patients around the median on a measure of anxiety (the Anxiety Content Scale from the MMPI-2), and a lie scale (again from the MMPI-2). 'Repressors', who were one of the groups, were distinguished by a low anxiety score and high lie scale score. The analysis of outcome from treatment revealed that the group of 'repressors' showed the least improvement out of the four groups on measures of depression (the Beck Depression Inventory: BDI, Beck, Ward, Mendelson, Mock and Erbaugh, 1961) and pain severity (the Pain Severity Scale of the Multidimensional Pain Inventory; Kerns, Turk and Rudy, 1985). It should also be noted that there was no main effect of anxiety on outcome. Burns (2000) claims that 'repressors' fare poorly because they struggle to acknowledge their problematic thoughts and behaviours, and consequently do not engage in treatment that aims to change these.

Another study offered a more simplistic explanation for variation in outcome. Risk, Turvey, Morgan and Humphreys (1997) analysed the outcome from a Fife based health management programme that was delivered to some patients in a group format and to others on an individual basis. They split their sample into two groups; patients who were assessed as having pain as their only problem and patients who also had a co-morbid psychological problem (including anxiety, depression, grief, marital problems, post traumatic stress disorder, panic, phobia and sexual problems). Interestingly, they reported that patients who only had pain as a problem (that is, no psychological co-morbidity) had higher 'did not attend' rates than did patients with

multiple problems. This difference was also reflected in psychologist ratings of treatment outcome (a six point scale with poles labelled 'complete improvement' and 'worse') which showed that patients with both pain and psychological problems had a significantly better outcome (22 per cent showing complete or marked improvement compared to 15 per cent of 'pain only' patients). There are a variety of possible explanations for this finding. The first is that patients with multiple problems recognise their need for help, are more motivated to attend reliably, and therefore have a better outcome. Secondly, CBT is only appropriate for patients who have additional problems and may even be off-putting (or not seen as having any value) to patients whose only problem is chronic pain.

Interestingly, a study of outcomes from a physical therapy programme for chronic pain patients (Williams, Grant and Main, 1995, cited in Watson, 2000) suggests that those with psychological problems (including depression and somatic anxiety) have a much poorer outcome from treatment as measured by pain intensity and disability ratings. These findings do not necessarily contradict those of Risk and her colleagues (1997), rather, it may suggest that psychologically based treatments are particularly successful for those who have psychological needs. Clearly, psychological problems will be addressed more capably by a clinical psychology led pain service, whilst they may interfere in treatment in a service where these needs are not as comprehensively addressed.

Another unpublished study of the effects of physical therapy (Muncey and Watson, 1999) reported that fear-avoidance beliefs might also play a role in determining

outcome. Using the TSK they found that the degree of shift in these beliefs across physiotherapy treatment was the single biggest predictor of residual disability at the end of treatment.

Finally, one study examined a host of factors that were potentially associated with attrition from a multidisciplinary pain management programme (Coughlan, Ridout, Williams and Richardson, 1995). This study had two stages: the first stage involved examining the physical and psychological profiles of those who dropped out during the 4-week inpatient treatment phase, the second stage examined those who failed to attend for their six month follow-up appointment. In a series of logistic regression analyses, just two variables, self-efficacy and the distance walked in ten minutes, predicted dropout from treatment, whilst only 'catastrophising' cognitions predicted failure to attend for follow-up.

It is evident that there has not been a great deal of research examining variations in outcome from pain management. The next session examines the broader psychological literature with the aim of identifying other variables that might have the potential to affect treatment outcome.

1.5 Outcome from CBT for depression

Most of the research that has examined outcomes from pain management programmes has focused on demonstrating which treatments are most effective. As the above discussion illustrates, there has been comparatively little research examining what causes variation in outcome from treatment. This primary focus on

demonstrating treatment effectiveness parallels the history of outcome research in psychotherapy for depression (Jarrett, Eaves, Granneman and Rush, 1991). Hollon and Najavits (1988) distinguished between 'predictive' and 'prognostic' indicators of treatment outcome. 'Predictive' indicators show which treatments are best for which groups of patients. 'Prognostic' indicators are those that predict which patients respond to an individual treatment type. Among the latter type of research, there exists a small body of research that has investigated whether certain types of dysfunctional assumptions, theorised to be prevalent among depressed individuals, are predictive of patients' responses to CBT for depression.

The Dysfunctional Attitudes Scale (DAS: Weissman, 1979) is a measure of assumptions (or schema) that are theorised to underlie the development and maintenance of depression. It has been examined by some studies as a variable that may potentially moderate responsiveness to CBT for depression. Keller (1983), Shea (1987) and Jarrett and his colleagues (1991) examined the efficacy of cognitive therapy given to outpatients suffering from depression. All three of these studies found that patients who entered therapy with high DAS scores had poorer outcomes than did patients with lower DAS scores at entry. Clearly, such a difference may simply be a reflection of pre-treatment differences in depression severity. Jarrett and his colleagues (1991) examined this possibility by conducting a series of regression analyses where these pre-treatment differences were held constant. In their analyses of outcome from cognitive therapy, where outcomes were represented as changes in the Beck Depression Inventory and the Hamilton Depression Rating Scale, the DAS

was a significant predictor of treatment success, even when pre-treatment differences on these two scales were controlled for.

What is the relevance of this for outcome from pain management treatment? Beck (1996) and Young (1990) have both proposed that personality disorders can be characterised by inflexible core beliefs (similar to those that are measured by the DAS). Furthermore, a number of authors (for example, Beck, Freeman and associates, 1990) have noted that CBT, which was originally designed as a short-term, problem-focused form of psychotherapy, may, if it is not modified, be a relatively ineffective type of treatment for patients with a personality disorder. Young (1994) has argued that this failure is due to four aspects of personality disorder that make it difficult for cognitive therapy to be successful. He suggests that patients with a personality disorder often do not have readily identifiable problems that traditional CBT would make the focus of treatment. He also suggests that patients with personality disorder have interpersonal difficulties that threaten to undermine the collaborative therapeutic relationship that is required in CBT. Traditional cognitive therapy also emphasises the recognition and modification of distortions in thinking. Young (1994) argues that this may be difficult for patients who have a personality disorder, as the hallmark of their condition is the degree of rigidity and inflexibility in personality traits and entrenched patterns of thinking. Finally, Young (1994) argues that patients with a personality disorder chronically block or avoid painful feelings and disturbing thoughts. As cognitive therapy asks patients to identify, challenge and modify their thoughts, Young (1994) argues that

this creates difficulties for patients with a personality disorder as, inevitably, this involves confronting that which they fear most.

Given that there is a high prevalence rate of personality disorder among patients with chronic pain (see above) the above analysis suggests that pain management programmes, that employ an unmodified CBT approach, will find it difficult to reliably produce a successful outcome for many patients.

1.6 Personality disorder, dysfunctional schemata, and outcome from pain management

Beck and his colleagues (1990) have suggested that underlying each personality disorder there is a specific set of beliefs and accompanying behavioural patterns. For example, they suggest that patients with a dependent personality disorder have a strongly held belief that they are incompetent and unable to cope on their own. Whilst one study has demonstrated that the dysfunctional beliefs that are measured by the DAS are related to broad measures of Axis II personality pathology (Ilardi and Craighead, 1999), it has yet to be demonstrated that specific beliefs underlie particular types of personality disorder.

Some authors have found that the DAS measures beliefs concerned with achievement, dependency, and self-control (Power, Katz, McGuffin, Duggan, Lam and Beck, 1994). If, as suggested by Ilardi and Craighead (1999) these beliefs are generally more prominent among patients with a personality disorder, then it is

possible that this may lead them to employ behavioural strategies that include relying heavily on others, avoiding making important decisions and challenges, and avoidance of emotionally charged situations. It is not difficult to imagine how these kinds of core beliefs can interfere with the rehabilitative treatments that are offered by pain management programmes. A patient who, for example, believes very strongly that they are incompetent and who feels very fearful of new challenges and consequently strives to avoid them, is not going to find it an easy task to engage with the changes in thinking and behaviour that pain management programmes encourage. Other examples cited by Beck (Beck, J.S. 1996) are patients with an avoidant personality disorder who believe, according to schema theories of personality disorder, that they are unlovable and vulnerable. Accordingly, these patients are thought to avoid intimacy, criticism and often feel uncomfortable about being open with others. Again, these kinds of difficulties have the potential to interfere with treatment progress as this often relies on honest feedback from patients about such things as the problems they had encountered with homework assignments. In a similar vein, patients with obsessive-compulsive personality disorders are thought to overvalue rules, responsibility and control which once more has the potential to interfere with treatment.

These schema based theories imply that treatment is likely to be most successful if patients who have a personality disorder are identified and offered a separate, longer term and more intensive treatment that focuses more on the therapeutic relationship (Beck, J. S., 1996). However, there are problems with this approach. The first of these are problems with the reliability of diagnostic classification systems that seek

to identify patients with personality disorders is poor (Weisberg, 2000). Therefore, separating patients by personality disorder diagnosis is likely to be fraught with error and there is the potential that such misclassification would be wasteful of resources (as individual, rather than group, treatment may be judged to be necessary) and may even do harm (through the process of 'labelling' individuals). Secondly, the idea of identifying patients with a personality disorder assumes that the kinds of schema that have been identified as potentially disrupting treatment are only present in these individuals and are absent in the rest of the patient population. Some authors have challenged this belief. Widiger and colleagues (Widiger, Trull, Hurt, Clarkin and Frances, 1987) have suggested, based on a multidimensional scaling analysis of personality traits, that personality disorders should be thought of as dimensions, rather than discrete entities. Such an approach would suggest that these dysfunctional schemata may not be distributed in a multi-modal fashion, but rather, spread more widely across the whole patient population.

There are currently two major measures of these dysfunctional schemata available to researchers. The next section describes how the specific schemata that are measured by these two scales might be related to outcome from pain management. This discussion consists of describing a series of hypothesised mechanisms, related to different schemata, by which these beliefs could result in poor outcome from treatment.

The DAS was mentioned briefly above. There are a number of versions of this measure. The 24 item version (the DAS-24; Power, Katz, McGuffin, Duggan, Lam

and Beck, 1994) has a factor structure that has been carefully tested. This produces three sub-scales, measuring beliefs related to 'Achievement' (e.g. 'My life is wasted unless I am a complete success'), 'Dependency' (e.g. 'My happiness depends more on other people than it does on me') and 'Self-control' (e.g. 'I should always have complete control over my feelings').

Individuals who hold strong 'Achievement' beliefs may struggle with the pacing approach that pain management advocates as they may interpret partial success as indicative of failure. It is reasonable to speculate that they may also find it hard to admit that they have made mistakes in the homework tasks that they were assigned and therefore would not benefit from the corrective advice given by the group's facilitators. Holding strong belief that others' happiness is more important than one's own and that it is crucial to be supported by these others (as measured by the 'Dependency' sub-scale of the DAS-24) could interfere with a person's outcome from pain management in a number of ways. Being overly concerned with others reactions could make pacing difficult in that it requires patients to indicate to others that they are unable to engage in certain activities because doing so would exceed the limits that they had set themselves. Indeed, in recognition of this potential difficulty, the pain management programme where the research described in this report was conducted includes a session in its programme on assertiveness and dealing with the demands of others. It is also possible to speculate that those who have strong 'Dependency beliefs may find assertiveness difficult, as they may fear that this could lead to supportive others being driven away. Most pain management programmes are provided as a group treatment. The discussions within these groups are often highly

emotional. Individuals who have strong 'Self-control' beliefs may find the emotional tone of these groups uncomfortable, which may lead them to drop out or to not attend to these discussions. They may also be unwilling to acknowledge how their own emotional states influence their behaviour and because of this, be unable to identify and to change aspects of their behaviour that may be affecting their pain and level of functioning.

The other popular measure of dysfunctional schemata is the Young Schema Questionnaire. There are two versions of this questionnaire, the long form (Young and Brown, 1999a) which measures sixteen schemata and the short form (Young and Brown, 1999b), which measures one less. The confirmatory factor analyses of the Long Form of the questionnaire also conducted a higher order factor analysis and found that the fifteen schemata are reducible to five 'meta-schema' (or 'schema domains', as Young, 1990, calls them). The short form is thought to have the same factor structure. The five schema domains are described below and each is followed by a discussion of how they might be related to outcomes from pain management.

Disconnection and Rejection

This comprises of the first five of the 'lower order' schema (that is, Emotional Deprivation, Abandonment, Mistrust/Abuse, Social Isolation and Defectiveness/ Shame). Young and Behary (1998) describe it thus,

"This domain is characterised by the expectation that one's needs for security, safety, stability, acceptance, nurturance, stability, protection, empathy, and guidance will not be met in a predictable manner. They arise from explosive, critical, rejecting, detached, withholding, unpredictable and abusive families of origin." (p. 347).

As this schema domain is characterised by mistrust and a worry that others are incapable of providing protection, it might be reasonable to assume that individuals who have this schema domain will be wary of their therapists. As a consequence, they may be less likely to follow their advice, fearing that to do so would put them at risk. They may also not trust their fellow group members and find it difficult to learn from their shared experiences.

Impaired Autonomy and Performance

This is comprised of the next four of the 'lower order' schema (that is, Failure, Dependence/Incompetence, Vulnerability to Harm & Illness, and Enmeshment). Individuals who have this schema domain are described by Young and Behary (1998) as having,

"...expectations about themselves and their environment that interfere with their perceived ability to separate, survive, function independently, or perform successfully. This is typically the result of an enmeshed, overprotective, or undermining family of origin that has failed to reinforce the child for performing competently outside the family, or has neglected to foster skills for independent functioning." (p. 347).

It is possible to view this schema domain as having a conceptual overlap with the 'Dependency' beliefs of the DAS. Therefore, patients with this set of schemata are likely to have similar problems in pain management. This schema domain contains additional beliefs about vulnerability that may be related to the fears of injury that are measured by the TSK (Kori, et al., 1990) which has already been shown to be related to outcome from pain management (Muncey and Watson, 1999)

Other-directedness

This is comprised of the next two of the 'lower order' schema (that is, Subjugation, and Self Sacrifice). It is described by Young and Behary (1998) as involving,

"... an excessive focus on the feelings, wishes, and desires of others, at the expense of one's own needs -- in order to gain approval, acceptance, love and connection, or avoid retaliation, or to avoid retaliation, rejection, blame or loss. This usually involves the suppression of one's natural inclinations and one's awareness of anger. The child typically comes from an environment where acceptance was conditional: the child learns to suppress normal needs and emotions in order to gain attention, approval and love. In many cases, the parents' emotional needs and desires are valued more than the unique needs and feelings of each child." (p. 348).

Possession of this schema domain may also undermine an individual's assertiveness abilities and may affect the patient's ability to successfully pace their activities.

Overvigilance and Inhibition

This consists of the next two of the 'lower order' schema (that is, Emotional Inhibition, and Unrelenting Standards). It is described by Young, and Behary (1998) as consisting of,

"Within this domain, there is often an excessive emphasis on controlling one's spontaneous feelings, impulses, and choices in order to avoid making mistakes. Parents usually stress meeting rigid, internalised rules and expectations about performance and ethical behaviour, often at the expense of happiness, self-expression, relaxation, close relationships, or health. The typical family origin is grim and sometimes punitive: performance, duty, perfectionism, following rules, and avoiding mistakes predominate over pleasure, joy, and relaxation. There is usually an undercurrent of pessimism and worry that things could fall apart if one fails to be vigilant and careful at all times." (p. 348).

The unrelenting standards that are part of this schema domain appear to have a conceptual relationship with the 'Achievement' beliefs of the DAS. Therefore, individuals who score highly on this domain are unlikely to admit making mistakes.

They may also be the kind of patient who would find it difficult to pace out their activities (this is advised so that pain flare-ups are reduced) if they have rigid expectations about the level of activity that they should be able to perform.

Impaired Limits

This is comprised of the last two of the 'lower order' schema (that is, Entitlement and Insufficient Self-Control/Self-Discipline). Young and Behary (1998) describes it thus,

> "(A) deficiency in internal limits, responsibility to others, or long-term goal-orientation. These schemata lead to difficulty in respecting the rights of others, co-operating with others, making commitments, or setting and meeting realistic personal goals. Patients with these schemata typically have families characterised by permissiveness, indulgence, or a sense of superiority, rather than appropriate confrontation, discipline, and limits in relation to taking responsibility, co-operating in a reciprocal manner, treating others as equals, and setting goals. In some cases, the child may not have been pushed to tolerate normal levels of discomfort." (pp. 347-8)

As the above definition makes clear, individuals with beliefs from this schema domain are not good at making commitments or setting goals. As pain management invariably involves this kind of commitment and goal setting, then patients with these schemata may find this a difficult approach to adopt. As their upbringing is likely to have made them wary of activities that produce discomfort they may be reluctant to engage in increased activity and the exercise programme that is usually a major part of pain management.

Hopefully, the above discussion will have illustrated the ways in which these schemata may effect patients' willingness to engage with their rehabilitation, and, ultimately, their outcome from treatment. Unfortunately, these hypotheses are very speculative. This level of speculation is unavoidable as there is an absence of

empirical work that has examined the behaviours that are thought to follow from these schemata.

Before leaving this discussion it is worth noting that these measures of schemata rely on patients' self-reports. There has been some work suggesting that such self-reports are open to particular biases. For example, it is well established that, on a range of variables, individuals tend to give themselves themselves' more favourable and less negative ratings than those that they give to (usually unspecified) others (see the review by Taylor and Brown, 1988). When this work is combined with research showing that depressed people show fewer of these positive biases, it has led some to argue that it is 'mentally healthy' to enhance one's positive attributes in this way (Taylor and Brown, 1988). However, more recent studies have questioned this theory. Colvin, Block and Funder (1995) conducted a series of studies, using cross-sectional and longitudinal data that examined the effects of these biases. First they constructed an index that measured the discrepancy between their own and trained raters descriptions of their personality that was weighted by how favourable the personality traits were seen to be. Colvin and his colleagues (1995) found that those participants whose evaluations were overly positive were described by others as "concerned with their own adequacy, as self-pitying, self-defeating, as basically anxious, and as lacking a sense of personal meaning in life" (p. 1156). This finding is of relevance to this study as at least some of the schemata that are its focus are associated with these 'pathological' personality attributes. One way around this potential problem is to not rely exclusively on the self-reports of patients.

1.7 Conclusions and hypotheses

The above review suggests that outcome from CBT based pain management programmes might be affected by the types of deep-rooted dysfunctional schemata that are prevalent in those patients with a personality disorder. To date, there has not been any research that has examined this suggestion (not even examining whether personality disorder affects outcome). The aim of this research is to examine the central hypothesis that dysfunctional schemata are associated with a poor outcome from a multi-disciplinary pain management programme. As there have been doubts about the validity of self-reports of personality characteristics (to which schemata are related) this study will also examine whether the associations between schemata and outcome vary according to whether these beliefs are derived from self versus informant reports. The study hypotheses are described, in formal terms, below.

Hypothesis 1. Following treatment in the pain management programme, participants' scores on the outcomes measures of pain, self-efficacy, mood, Pain Stages of Change, physical functioning, disability, and fear of (re-)injury, will have improved.

Hypothesis 2. Patients who report high levels of dysfunctional beliefs, as measured by the YSQ-SF, will show less improvement on the outcomes measures, following the pain management programme, compared to those who report lower levels of dysfunctional beliefs.

Hypothesis 3. Patients whose family and friends report that the patient has high levels of dysfunctional beliefs, as measured by the YSQ-SF, will show less

improvement on the outcomes measures, following the pain management programme, compared to those whose family and friends report lower levels of dysfunctional beliefs.

Hypothesis 4. Patients whom the psychologists rate as having high levels of dysfunctional beliefs will show less improvement on the outcomes measures, following the pain management programme, compared to those who are rated as having lower levels of dysfunctional beliefs.

Hypothesis 5. Patients who report high levels of dysfunctional beliefs, as measured by the DAS, will show less improvement on the outcome measures, following the pain management programme, compared to those who report lower levels.

Hypothesis 6. Those patients who complete the pain management programme, and patients who completed the assessments required by the programme, will have lower levels of dysfunctional beliefs, as measured by the YSQ-SF self- and informant-report, the DAS, and psychologist ratings.

CHAPTER 2

METHODS.

2.1 Design

This study employed a within-subjects, observational, design. Parts of the data were collected using postal survey methods, and these were combined with longitudinal (pre and post-intervention) clinical and questionnaire data. Ethical approval was obtained from the Lothian Research Ethics Committee.

2.2 Participants

Participants consisted of 66 chronic pain patients who were part of six consecutive multi-disciplinary pain management programmes. Participants were marked for exclusion if they did not have a full understanding of English, including in its written form, or if they exhibited evidence of cognitive impairment. The clinical psychologist assessed these criteria informally at the initial interview. As both of these were also criteria for entry into the pain management programme, it was unsurprising that none of the potential study participants had to be excluded. The numbers of participants in each group varied from 9 to 12 (mode = 11). The groups, which ran from 1 January 2001, to 30 June 2001, took place in a large rehabilitation hospital in the East of Scotland. Patient demographic characteristics are given in Table 2.1.

The group programmes ran for 12 sessions, spread over 10-12 week periods, with each session lasting for 3 hours. The content of a typical session would normally

involve a physiotherapist led exercise session, individual goal setting, group feedback on pacing, relaxation and on the goal-directed homework that had been set in previous sessions. Each session would also include a talk/demonstration. These talks covered various aspects of pain management, from a cognitive-behavioural perspective, and followed the format of a typical pain management programme (see the introduction for a description of cognitive-behavioural pain management programme).

Table 2.1. Demographic characteristics of the sample

Age at start of group (years)	Mean	Standard deviation
(3 cases with missing data)	44.4	9.7
Sex	Males	Females
	26 (39%)	40 (61%)
Marital Status	Married/Cohabiting	Single/Divorced/ Widowed
(3 cases with missing data)	46 (70%)	16 (30%)
Occupational Status	Working	Not Working
(3 cases with missing data)	10 (17%)	50 (83%)

Patients recruited to this particular programme were unselected as regards the site of their pain. The commonest site of pain among this sample was in the lower back (see Table 2.2, for a description of the pain characteristics of this sample) which is typical for pain management programmes.

2.3 Instruments.

2.3.1 Outcome variables

Outcome from the pain management programme is routinely assessed across a number of domains. These domains consisted of pain intensity, mood, self-efficacy,

stages in the acceptance of a self-management approach to pain, self-reported disability, physical functioning, and fear of (re-)injury. The variables that were used to measure these domains were not selected by the author. Rather, these variables are those that the department in which the research was conducted use routinely to guide assessment and treatment. The choice of the specific variables used in the department was guided by the recommendations issued by a conference that was convened to discuss outcome measurement from pain management programmes (Peat, Moores, Goldingay and Hunter, 2000; Williams, 2000).

Table 2.2. Characteristics of the pain histories of the sample

Site of pain	Number[†]	%
Lower back	45	68
Middle back	4	6
Neck	12	20
Shoulder	8	12
Hip	8	12
Leg	10	15
Arm	7	11
Hand	3	4.5
Other	14	21
	Mean	Standard deviation
Years of pain	7.7	5.5
Number of pain days in last week	5.3	1.7
Number of GP visits in last month	1.9	2.2
	Number	%
Current analgesic use (at start of group)	54	82

[†] Individuals can have pain in multiple sites. Therefore the numbers in these categories exceed the total number in the sample

The department recorded the total scale scores but not the individual item scores (where a scale is constructed from multiple items). Consequently, the scores for the individual items were not available to the author. Therefore, the internal consistency of the scales could not be evaluated with this particular sample. However, these are popular measures and their psychometric properties are generally well known.

With the exception of the measures of physical functioning, these measures consisted of questionnaire data. The first set of questionnaires were posted out to patients approximately one week prior to the commencement of the programme and were collected from patients on the first day of treatment. At the end of the penultimate group session the second set of questionnaires were distributed to the patients. These were then collected during the last session. The first set of physical functioning measures was carried out during the assessment interview (approximately four to eight weeks prior to treatment). The second set was collected during the last treatment session.

Pain

A ten-point, numerical rating scale (NRS) was employed to measure pain intensity (see Appendix I, question 6). The department also employs a second NRS that measures the degree of pain-related distress that is experienced. However, this was not used in this study as this is a less popular measure and its properties are less well known. The NRS pain intensity measure was chosen because of its simplicity and ease of use (Holroyd, Talbot, Holm, Pingel, Lake and Saper, 1996). An NRS type of measure was chosen over a visual analogue scale (VAS) type of measure, the other

obvious and simple choice, because the former type of measure is regarded as easier for patients to use. For example, it has been reported that some older patients have had difficulties in understanding VAS type measures (Jensen, Karoly and Braver, 1986). Furthermore, NRS measures are also thought to be more sensitive to variations between patients (Jensen et al., 1986). The respondent's score is the number chosen (from 0-10), with higher scores indicating a higher degree of pain intensity. No formal psychometric or normative data are available, but NRS measures of pain intensity have been found to correlate highly with other such measures (Jensen et al., 1986). Other measures of pain were considered, such as ratings of pain behaviours (for example Keefe and Block, 1982) and the McGill Pain Questionnaire (Melzack, 1975). However, the demands of these measures, in terms of patient or staff time, precluded their use. An NRS pain intensity rating was completed by the study participant, both before and at the end of their pain management programme. Both of these variables appeared to be normally distributed (see the low skewness and kurtosis estimates in Table 3.2). The key pain intensity variable employed in this study is the degree of change between the assessment taken pre-group and the assessment taken post group. This variable was also normally distributed.

Self-efficacy

The Pain Self-Efficacy Questionnaire (PSEQ: Nicholas, 1988, see Appendix II) is a ten-item, self-report inventory that seeks to assess a chronic pain patient's beliefs that he/she can perform various activities or functions despite their pain. Patients are asked to rate, on a seven point scale (where 0 equals 'not at all confident' and 6

equals 'completely confident') how confident they feel about performing each of the ten activities The potential range of scores is from 0 to 60 with high scores indicating greater self-efficacy. Evidence of the reliability and validity of the PSEQ were reported in an unpublished Ph.D. thesis (unfortunately, not available to the author). However, this measure has been employed in two studies, both of which were published in peer reviewed journals (Coughlan, et al, 1995; Nicholas, Wilson and Goyen, 1992). This variable was measured at the same two time points as the NRS ratings and they also appeared to be normally distributed. However, the change score showed some degree of skewness and therefore it was transformed, using a natural log transformation, that resulted in a more normal distribution (see Table 3.3).

Mood

The pain management programme routinely employs two measures of patients' mood. These are the Beck Depression Inventory-Second Edition (BDI-II: Beck, Steer and Brown, 1996) and the Beck Anxiety Inventory (BAI: Beck, Epstein, Brown and Steer, 1988). The BDI-II is 21 item self-report instrument for measuring the severity of depression (see Appendix III) and it replaces the original BDI (Beck, Ward, Mendelson, Mock and Erbaugh, 1961). Its revision was carried out to ensure that the instrument corresponds to the criteria for diagnosing depressive disorder, as listed in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV: 1994). The original BDI became the most widely used and well-accepted measure for assessing the severity of depression (Pitrowski, Shelley and Keller, 1995), and the same may very likely be said of the revised version. The BDI-II is scored by summing the ratings for the 21 items. Each

item is rated on a 4-point scale, ranging from 0-3. This gives a possible range of scores from 0-63. In terms of its psychometric properties, the BDI-II has a high degree of internal consistency (Cronbach's alpha = 0.92, among psychiatric outpatients) and demonstrates excellent test-retest stability over a period of one week (r=0.93, p<0.001; Beck et al., 1996). Beck and his colleagues (1996) also showed that the BDI-II has convergent (it has a strong association with the Hamilton Psychiatric Rating for Depression, r=0.71: Hamilton, 1960) and discriminant validity (as evidenced by the weaker association with the Hamilton Rating Scale for Anxiety, r=0.47: Hamilton, 1959).

The Beck Anxiety Inventory (Beck et al, 1988, see Appendix IV) is also a 21 item self completion instrument. It is designed to assess the severity of self-reported anxiety in adults and adolescents. The items were selected from a total of 86 symptoms of anxiety (these being drawn from other, pre-existing measures of anxiety) with items being rejected because of conceptual redundancy or by item analyses. The items are scored on a 4-point scale (ranging from 0-3) with total possible scores falling in the range of 0-63. The internal consistency of the scale is reported to be good (Cronbach's alpha = 0.92, Beck et al., 1988). Test-retest reliability over one week is also good (r=0.75, Beck et al., 1988). Research using the BAI shows evidence of convergent and discriminant validity when the instrument is correlated with other scales that measure anxiety and with those measuring depression (Beck and Steer, 1993).

Both of these variables were measured at the same two points in time as were the other outcome variables. Whilst the BDI-II appeared to be normally distributed the BAI scores, at both time points, showed some degree of skewness and therefore they were transformed, using a natural log transformation, that resulted in more normal distributions. Both the BAI and the BDI-II change scores appeared to be normally distributed (see Table 3.4).

Pain Stages of Change Questionnaire (PSCOQ; Kerns et al., 1997).

This was described in the introduction. It is a 30-item, self-report measure that seeks to ascertain preparedness to take on a self-management approach to chronic pain (see Appendix V). Each item offers participants the choice of 5 Likert type responses (ranging from strongly disagree to strongly agree). The scale produces four sub-scale scores (this division being supported by a confirmatory factor analysis; Kerns et al., 1997), representing the four theorised stages of behavioural change. These stages are labelled, 'pre-contemplation' (7 items), 'contemplation' (10 items), 'action' (6 items) and 'maintenance' (7 items). Kerns and his colleagues (1997) report adequate internal consistency statistics (Cronbach's alpha's were 0.77, 0.82, 0.86, and 0.86 for the above four scales, respectively) and test-retest stability over a period of one to two weeks (0.74, 0.82, 0.76, and 0.88, respectively). A comparison of scores across the four sub-scales is hampered by the fact that the number of items comprising each sub-scale varies. In order to make these comparisons more meaningful, the sub-scale scores are represented as average item scores (that is, the

sub-scale total divided by the number of items in the sub-scale). The potential range of scores is therefore between 1 and 5.

Like the other outcome variables, the PSOCQ was measured both prior to and at the end of the pain management programme. All four sub-scales appeared to be normally distributed at both time points as were the four scores that represented pre to post-group changes in these variables (see Table 3.5).

Measures of Physical Functioning

Approximately four weeks prior to the start of the group each patient was assessed by a psychologist and a physiotherapist in order to determine whether or not they were suitable for the programme. During the physiotherapy part of this assessment the patient's current level of physical functioning was assessed (see Appendix VI). Part of this assessment included a test of the patient's walking. This was comprised of two components, which were the number of metres walked in 2 minutes and a physiotherapist rating of walk quality. Another component of the test was a measure of standing from a sitting position. This comprised two parts; the number of sit-to-stand movements completed in 2 minutes and a physiotherapist rating of sit to stand quality. Patients were also asked to get down, and back up from, a prone position on the floor. Patients' difficulty with this manoeuvre was also rated by the physiotherapist. Finally, the assessment consisted of a measure of patients' self-reported difficulty in climbing stairs. Only the two timed components of this assessment were included here (the walking and sit-to-stand tests). The reason for not including the other components (which were all quality ratings) was that there is little

information on the psychometric properties of these assessments when used with this patient group. The other two tests, on the other hand, have been demonstrated to have good test-retest and inter-rater reliability characteristics (Harding, Williams, Richardson, Nicholas, Jackson, Richardson and Pither, 1994). Harding and colleagues (1994) also produced results suggesting that these are valid measures of physical functioning (this was demonstrated by a pattern of statistically significant correlation coefficients of these measures with each other and with other measures of physical functioning). These measures were also shown to be sensitive to changes representing improvements following multi-disciplinary pain management treatment (Harding et al., 1994).

Both of the walking assessments showed a significant degree of skew, which was reduced using natural log transformations. The sit-to-stand assessments, on the other hand, showed a more normal distribution. Both the walking and sit-to-stand change scores were markedly skewed and kurtotic. Attempts were made to transform the distribution of these variables, but with little effect. Plots of the distribution suggested a few extreme values that were distorting the distribution of these variables. After these values were removed (3 values were removed from the walking change score and 2 from the sit-to-stand change score) the distributions of these 'trimmed' variables appeared to approximate a normal distribution (see Table 3.6).

Disability

This was measured, both pre and post-group, using the short form of the Sickness Impact Profile (SIP-SF: Roland and Morris 1983, see Appendix VII). The SIP-SF is

a self-report measure consisting of 23 items that ask about the presence or absence of functional problems. Responses are dichotomous (yes/no, scored 1 or 0) and the potential range of scores from this scale if from 0 to 23. The SIP-SF was developed from the longer (136 item) Sickness Impact Profile (SIP-LF: Bergner, Bobbitt, Carter and Gibson, 1981) and was chosen over the SIP-LF for a number of reasons. These reasons included its brevity (particularly important as the study participants were asked to fill in a number of questionnaires) and the fact it appears to be as psychometrically sound as the long-form (Jensen, Strom, Turner and Romano, 1992). The only disadvantage of the SIP-SF, as compared to the SIP-LF, is that its coverage of psychosocial aspects of disability is relatively poor. However, as participants were completing a number of more detailed measures of their psychological state (affect and beliefs) this was not seen as a major disadvantage. The SIP-SF appears to be reasonably stable over time. The test-retest coefficients ranged from 0.65 to 0.77 over a range of different time intervals, with the median interval being 39 days (Jensen et al., 1992). The scores also appeared to be normally distributed at both time points, as were the change scores (see Table 3.7).

Fear of (re-)injury

The Tampa Scale for Kinesiophobia (TSK: Kori et al., 1990, see Appendix VIII) was described in the Introduction. It is a 17 item, self-report measure of the fear of movement and activity, in case these were to cause (further) physical damage. Patients are asked to indicate their level of agreement/ disagreement with each of the 17 statements using a 4-point Likert scale. Four of the items are reverse coded (they indicate a lack of fear) and the items are totalled to produce a score in the range from

0 to 51. Work examining the validity of the measure was described in the introduction. Cronbach's alpha for the scale was reported by Vlaeyen and his colleagues (1995) to equal 0.77, which they described as fair. The TSK was measured at the same two time points as the other outcome variables and descriptive statistics are given in Table 3.8. Both the pre and post-group TSK scores, and the TSK change scores appeared to be reasonably normally distributed (see Table 3.8).

A final dependent variable was the number of sessions attended by participants. This may be an index of commitment to the self-management approach, but it is also recognised that it may be affected by other factors such as pain severity, and health and social problems. This variable was highly skewed (the median number of groups attended was 10) and it was felt that a transformation (to make the variable more normally distributed) was unwarranted as it could not be assumed that the underlying distribution was a normal one.

2.3.2 Predictor variables

The Young Schema Questionnaire-Short Form (YSQ-SF)

The YSQ-SF is a 75-item scale that measures 15 different dysfunctional schemas and five schema domains (Young and Brown, 1999a, see Appendix IX). It is derived from the Long Form of the questionnaire, which is comprised of 205 items (Young and Brown, 1999b). There has been little work examining the psychometric properties of either of these questionnaires, and that is particularly the case with the Short Form of the questionnaire. However, a recent study has suggested that the two questionnaires have similar levels of internal consistency, reliability and discriminant

validity (Waller, Meyer and Ohanian, 2001). Both exploratory and confirmatory factor analyses have generally supported the hypothesised factor structure of the Long Form. Unfortunately, there have been no published factor analytic studies of the YSQ-SF. However, Young reports on his web-site (http://www.schematherapy.com/id55.htm, date accessed, 10 July, 2001) that two recent, and as yet unpublished, studies find the same factor structure for the Short Form as has been found for the Long Form. This would be a reasonable finding as the items from the YSQ-SF are drawn from the items in the long forma that had the highest factor loadings. The fifteen schemata and five schema domains of the YSQ-SF were described in the introduction.

The 75 items of the YSQ-SF are each accompanied by a 6-point Likert rating scale. This asks respondents to indicate how well the item describes them (from 'completely untrue of me' to 'describes me perfectly'). Each of the individual schemata comprises five items. This means that the individual schema scores have the potential range of 6 to 36. Generally, these schema scales had reasonably high levels of internal consistency. With a single exception (the scale measuring 'Entitlement/Grandiosity, which produced an alpha equal to 0.56) Cronbach's alphas' ranged from 0.78 to 0.92 (see Table 3.9). The schema domain sub-scales are comprised of between two and five of the individual schemata scores. The estimates of the internal consistency of the schema domain sub-scales were equally impressive, with alphas ranging from 0.78 to 0.93. The descriptive statistics for the participants' YSQ-SF scores are also given in Table 3.9. Because of the large numbers of sub-

scales that can be derived from the YSQ-SF, only results obtained from employing the schema domains are reported in detail.

Informant ratings

As there were doubts about the validity of self-completion questionnaires, informant ratings of the YSQ-SF were also used. These were obtained by asking the patients to pass on to a 'friend or relative who knows you well' an adapted copy of the YSQ-SF (see Appendix X). This informant version was identical to the patients' self-completion version, with the exception that the instructions asked the informant to 'complete the questionnaire as if you are [patient's name inserted]'. The estimates of the internal consistencies of the five schema domain sub-scales were as equally impressive as for the self-completion inventory (Cronbach's alpha's ranged from 0.78 to 0.93, see Table 3.10).

Psychologist ratings

As the participants friends and relatives may not necessarily be astute judges of personality, a further set of ratings were taken from the clinical psychologists that were running the pain management groups. Time pressures precluded the (75 item) YSQ-SF being employed for these ratings. Therefore, a short (5 item) rating scale was used (see Appendix XI). The clinical psychologists were asked to judge, on a four point Likert scale, how well the five schema domains from the YSQ described the patients from their group. These ratings were scored as their inverse, so that higher ratings reflected higher levels of the schema domains.

The descriptions of these schema domains were derived from those given by Young and Behary (1998; and see the introduction). These ratings were made after the 4th session of the pain management programme. This point was chosen because it was felt that it gave the clinical psychologists an opportunity to become acquainted sufficiently with the patients. It was also deemed to be early enough in the course of the programme for these judgements not to be coloured by the psychologists becoming aware of the patient's likely outcome from treatment (the raters were aware of the aims of the study). Anticipating that an awareness of the patient's likely outcome may affect these ratings, the psychologists were also asked to make this awareness explicit by rating each patient's likely outcome, on a 6-point scale. This made it possible to adjust statistically the psychologists' ratings of the schema domains.

These ratings were designed for this study and therefore their psychometric properties were unknown. In an attempt to establish whether or not these ratings could be carried out in a reliable manner by different psychologists the author and his supervisor independently carried out these ratings on the participants from one of the groups that they were both working in. These ratings were then correlated, using Spearman's *rho*. These results are given in Table 2.3.

These results suggest that the majority of the items can be rated reliably by separate psychologists. However, two of the items show only moderate and non-significant associations. As these ratings were made on only nine cases (and the tests were very low in statistical power) it was decided to retain these items, rather than dispensing

with them altogether. However, more caution was exercised in interpreting results that employed these two items.

Table 2.3. Inter-rater reliability estimates of the psychologist ratings (n = 9).

Schema Domain ratings	Correlation coefficient	Probability value
1. Disconnection/Rejection	0.67	$p<0.05$
2. Impaired Autonomy	0.44	ns
3. Impaired Limits	0.88	$p<0.01$
4. Other-Directedness	0.76	$p<0.05$
5. Over-vigilance/Inhibition	0.49	ns
6. Outcome rating	0.68	$p<0.05$

Dysfunctional Attitudes Scale

The Dysfunctional Attitudes Scale (DAS Weissman and Beck, 1978, see Appendix XII) is a measure of the underlying assumptions in Beck's (Beck, 1967) cognitive theory of depression. Although the original scale is a very lengthy one (and lengthy questionnaires were avoided wherever possible as the study participants were asked to fill in a great many) there is a briefer DAS scale. The DAS-24 is a 24-item version of the scale, the factor structure of which has been carefully tested (Power, Katz, McGuffin, Duggan, Lam and Beck, 1994). This measure produces three sub-scales, labelled 'Achievement', 'Dependency' and 'Self-control'. Each of these sub-scales contains 8 items (with 3 on one sub-scale being scored inversely) and high scores reflect higher levels of the assumptions it is thought to measure. The estimates of the internal consistency of these 3 sub-scales all appeared to be reasonable (0.89, 0.71 and 0.77 respectively).

2.4 Procedure

Patients for the pain management programme are referred from a variety of sources and from a number of areas in central Scotland. Once the referral has been received the patients are placed on a waiting list. Once at the top of the waiting list, patients are invited for an assessment interview. In this interview the patients are seen by a psychologist, who records their pain histories and assesses their readiness to engage in self-management. An assessment is also made of other factors (such as current high levels of psychological disorder) that may interfere with outcome from the group programme. The patients are also seen by a physiotherapist, who assesses their physical condition in order to establish whether they have the physical capabilities to engage in the exercise portion of the group programme. The outcome of the assessment interview is determined by whether or not any factors that might cause treatment problems are uncovered. Patients whose treatment appears likely to be uncomplicated are invited to take part in the group programme, and usually commence this in 4 to 8 weeks following the assessment interview. Patients who have more severe psychological problems are usually offered an individual pain management programme (usually involving both psychology and physiotherapy) or are given a short number of individual sessions with a psychologist with the aim of them moving on to the group programme if this treatment is successful. Marked physical problems are given a similar set of treatment options, with the emphasis on individual physiotherapeutic treatment. Occasionally, either with or without individual treatment, patients are judged as unlikely to benefit from the group programme or from further individual treatment. These patients are discharged back to the care of the referring agency. All of the participants in this study either entered

the group directly following the assessment interview or after they had successfully completed a short period of individual treatment.

The pain management programme participants were sent a letter, inviting them to take part in the study, between one and two weeks prior to the commencement of the group (see Appendix XIII). Along with this letter was a consent form (see Appendix XIV), copies of the YSQ-SF and the DAS questionnaires (along with a stamped, addressed envelope in which to return it), and an envelope that they were asked to pass onto 'a family member or friend who knows you well'. Inside this envelope was an information sheet letter, explaining the study and inviting them to take part. The envelope also contained a consent form (see Appendix XV) and a copy of the YSQ-SF (along with a stamped, addressed envelope in which to return it). The informant version of the YSQ-SF contained the instructions to 'complete the questionnaire as if you are [patient's name inserted]'. Participants who had not returned the questionnaires before the group treatment commenced were reminded to do so at the first session of the programme. If the questionnaires were still not returned by the following week, then a letter was sent reminding participants to return them (see Appendix XVI). This letter was accompanied by further sets of the questionnaires, in case the original copies had been mislaid.

All of the questionnaires had a detachable front sheet that contained the patient's name. These front sheets were removed on receipt of the questionnaires so that the responses could only be linked to the participant through a unique identification number. The questionnaires and identifying front sheets were stored separately.

2.5 Statistical analyses

The data were entered into an SPSS database (version 10, SPSS inc, 2001) and the majority of the analyses were conducted using this programme. The analyses consisted of computing correlation coefficients to represent various associations. These coefficients were computed using the Pearson product moment test unless the data were not distributed normally (and the distribution could not be transformed to normality), or when the sample size was below 20 cases. In these cases the correlation coefficients were computed using Spearman's *rho*. Tests of mean differences were conducted using independent *t*-tests.

One unfortunate aspect of this study was that there were very many tests of the same hypothesis and, therefore, the chances of making a type I error with an alpha level of 0.05 was high. One possible solution would have been to adjust the alpha level for the total number of tests. However, this was too conservative an option as the analyses were of low power due to the small sample size. One alternative was to adjust the alpha level across bands of tests. For example, the association between the participant's self-reported schema domain of Disconnection/Rejection and their outcome from the programme was tested across 12 different dependent variables. This set of tests was regarded as a 'band' and the alpha level within this band was adjusted using Bonferroni's correction. This suggested a corrected alpha level of 0.004 that was then used to assess the statistical significance of an association. Similar corrections were made across other 'bands' of tests.

As there were so many tests of the hypothesis, weighted average correlation coefficients were also computed using DSTAT (Johnson, 1989, 1993). This is a software programme that is used in meta-analysis and was used for two reasons. Firstly, correlation coefficients are not on a linear metric (that is, the difference between 0.1 and 0.2 is less than the difference between 0.2 and 0.3) and so simple averaging procedures can produce distorted estimates. Secondly, there were variations in the sample sizes that produced these coefficients, but DSTAT calculates an average, weighted coefficient that takes account of these differences. Post-hoc power analyses were also conducted and these were based on the average correlation coefficient produced by a 'band' of tests.

CHAPTER 3

RESULTS

3.1 Descriptive statistics and outcome from pain management (hypothesis 1)

Participant numbers varied considerably in these analyses. This was due to a number of reasons. Firstly, some participants did not complete the initial pre-group assessment measures. Secondly, twelve patients attended very few of the first four sessions (6 had dropped out of the programme by session four) and so the psychologists found it impossible to make schema and outcome ratings on these patients. Thirdly, less than half of the potential study participants agreed to complete the YSQ-SF, DAS, and to pass on the informant YSQ-SF to a relative or friend. Finally, approximately half of the patients did not complete all or some of the post-group assessment measures. This pattern of non-responses to different aspects of the study resulted in marked variations in sample size across the following analyses. A summary of the numbers of patients completing various aspects of the study is given in Table 3.1. (below).

Means and standard deviations for all of the dependent variables are given in Tables 3.2 to 3.8. The average pain intensity NRS score at the start of the group programme was 7.47, which was reduced to 6.84 by the end of the programme (see Table 3.2). This change was statistically significant ($t = 2.12$, df = 37, $p<0.05$, one tailed) and supported hypothesis 1. The standardised mean difference, between these two scores is equivalent to a Cohen's g of 0.38.

Table 3.1 Numbers of participants providing data for various aspects of the study.

Aspect of the study	Numbers*
1. Started the PMP	66
2. Provided both pre and post-PMP outcome data	34-38
3. Provided self-completion YSQ-SF data	32
4. Provided informant-completion YSQ-SF data	25
5. With Psychologist schema ratings	54
6. Provided DAS data	31
7. Provided data described in rows 2 and 3 of this table	14-20
8. Provided data described in rows 2 and 4 of this table	11-15
9. Provided data described in rows 2 and 5 of this table	30-35
10. Provided data described in rows 2 and 6 of this table	14-20

* Numbers sometime appear as ranges in this column due to participants completing some outcome measures and not completing others.

Table 3.2 Pain intensity scores *(NRS pain intensity: all n's = 38)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew	Kurtosis	S.E. of Kurtosis
Pain 1	7.47	1.45	0.05	0.31	0.14	0.61
Pain 2	6.84	1.82	-0.01	0.38	-0.30	0.75
Pain Change	-0.63*	1.84	0.74	0.38	1.02	0.75

* $p<0.05$

The average self-efficacy scores at the beginning of the programme were 25.5 and these increased to 31.8 by the end of the programme (see Table 3.3). This difference was statistically significant ($t = 3.49$, df = 37, $p<0.001$, one tailed) and supported hypothesis 1. The standardised mean difference was equal to a Cohen's g of 0.49.

Table 3.3 Self-efficacy scores *(PSEQ: Nicholas, 1988: all n's = 38)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Self-Efficacy 1	25.5	10.7	0.35	0.31	-0.30	0.61
Self-Efficacy 2	31.8	14.9	0.36	0.38	-1.08	0.75
Self-Efficacy change	6.28**	11.10	0.58	0.44	0.19	0.75

** $p<0.01$

The average BAI score at the beginning of the programme was 17.5, which decreased to 14.8 by the end of the programme (see Table 3.4). This difference was statistically significant ($t = 2.49$, df = 36, $p<0.01$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.23.

The mean BDI-II score at the start of the programme was 21.4, which reduced to 18.0 by the end of treatment (see Table 3.4). This difference was statistically significant ($t = 2.61$, df = 36, $p< 0.01$) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.30.

Table 3.4 Mood scores *(BAI, Beck et al., 1988; BDI-II, Beck et al., 1996*: n = 37*)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
BAI 1†	17.5	12.0	-0.45	0.31	-0.15	0.62
BAI 2†	14.8	11.8	-0.40	0.38	-0.81	0.75
BAI change	-2.73**	8.47	-0.07	0.41	0.92	0.80
BDI-II 1	21.4	10.6	0.22	0.31	-0.64	0.62
BDI-II 2	18.0	11.9	0.53	0.38	-0.49	0.75
BDI-II change	-3.40**	8.40	0.60	0.41	1.01	0.80

† The BAI scores were transformed in order to reduce skewness. However, the untransformed mean and standard deviation values are given here alongside the transformed skewness and kurtosis statistics. ** $p<0.01$

The Pain Stages of Change Questionnaire produces four sub-scales. The time 1, time 2, and change scores for these sub-scales are given in Table 3.5.

Table 3.5 Pain Stages of Change Scores *(PSCQ: Kerns et al., 1997*: all n's = 34*)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
PSCQ-PC1	2.64	0.81	0.47	0.32	-0.02	0.63
PSCQ-C1	4.26	0.59	-0.43	0.32	-0.24	0.62
PSCQ-A1	3.02	0.95	-0.01	0.32	-0.53	0.63
PSCQM1	3.12	0.86	-0.19	0.32	-0.57	0.63
PSCQ-PC2	2.13	0.96	0.71	0.39	-0.33	0.76
PSCQ-C2	4.04	0.68	-0.20	0.39	-0.92	0.76
PSCQ-A2	3.98	0.70	-0.42	0.39	-0.46	0.76
PSCQ-M2	4.14	0.58	-0.30	0.39	-0.95	0.76
PSCQ-PC change	-0.51***	0.63	0.11	0.40	0.14	0.79
PSCQ-C change	-0.22*	0.76	-0.58	0.39	1.07	0.77
PSCQ-A change	0.96***	1.02	0.21	0.40	-0.41	0.79
PSCQ-M change	1.02***	0.66	0.48	0.40	0.49	0.79

PC = pre-contemplation; C = contemplation; A = action; M = maintenance
* $p<0.05$; *** $p<0.001$

The average Pre-Contemplation sub-scale score at the beginning of the programme was 2.64, which was reduced (in line with expectations) to 2.13 by the end of the programme. This difference was statistically significant ($t = 4.74$, df = 33, $p<0.001$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.57. The mean Contemplation score at the beginning of the programme was 4.26, which was reduced to 4.04 by the end of treatment. This difference was statistically significant ($t = 1.73$, df = 35, $p<0.05$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a

Cohen's *g* of 0.35. The average Action score was 3.02, which increased to 3.98 by the end of the programme. This difference was statistically significant ($t = 5.44$, df = 33, $p<0.001$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.97. The mean Maintenance score at the beginning of treatment was 3.12, which increased by the end of treatment to 4.14. This difference was statistically significant ($t = 8.97$, df = 33, $p<0.001$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 1.42.

The descriptive statistics for the physiotherapist measures of physical functioning are given in Table 3.6.

Table 3.6 Physical functioning scores *(Walking distance and number of sit-to-stands in 2 minutes; Harding et al., 1994*: all n's = 35*)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Walk 1[†]	120.9	60.7	-0.10	0.31	-0.08	0.61
Walk 2[†]	133.7	60.4	-0.34	0.39	-0.04	0.77
Sit to stand 1	16.5	8.24	0.40	0.31	-0.51	0.61
Sit to stand 2	22.1	12.1	0.55	0.39	-0.17	0.77
Change walk[††]	12.8[**]	17.7	-0.38	0.41	0.56	0.81
Change s-s[††]	5.6[***]	5.86	0.03	0.41	0.80	0.80

[†] The walk variables were transformed in order to reduce skewness. However, the untransformed mean and standard deviation values are given here alongside the transformed skewness and kurtosis statistics.

[††] The change scores showed extremely significant skewness and kurtosis statistics. Natural log transformations were not able to improve the distribution of these variables. An outlier analysis suggested that there were 2 or 3 extreme values. These values were removed and the 'trimmed' variables were more normally distributed.

[**] $p<0.01$, [***] $p<0.01$

The average distance walked in 2 minutes at the start of the programme was 120.9 metres, which increased to 133.7 metres by the end of treatment. This difference was statistically significant ($t = 2.52$, df = 34, $p<0.01$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.21. The average number of 'sit-to-stand' manoeuvres accomplished in 2 minutes at the start of the programme was 16.5, which increased to 22.1 by the end of the programme. This difference was statistically significant ($t = 3.73$, df = 34, $p<0.001$, one tailed) and supported hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.55.

The average disability score at the beginning of the programme was 14.2, which decreased to 13.3 by the end of treatment (see Table 3.7). This difference was not statistically significant ($t = 1.56$, df = 37, $p=0.06$, one tailed) and did not support hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.17.

Table 3.7 Disability scores *(SIP-SF: Roland and Morris, 1983*: all n's = 38*) scores*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
SIP-SF 1	14.2	4.93	-0.13	0.31	-0.68	0.61
SIP-SF 2	13.3	5.50	-0.29	0.38	-0.67	0.75
SIP-SF change	-0.90	3.54	-0.03	0.38	-0.28	0.75

Finally, the average TSK score at the beginning of treatment was 19.3, which decreased by the end of the programme to 16.5 (see Table 3.8). This change was statistically significant ($t = 2.71$, df = 36, $p<0.01$, one tailed) and supported

hypothesis 1. The standardised mean difference was equivalent to a Cohen's *g* of 0.29.

Table 3.8 Fear of (re-)injury *(TSK: Kori et al., 1990*: all n's = 37*)*

Variable name	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
TSK 1	19.3	9.73	0.33	0.31	-0.45	0.62
TSK 2	16.5	9.38	0.48	0.38	-0.57	0.75
TSK change	-2.8**	6.19	-0.19	0.39	0.77	0.76

** $p<0.01$

With the exception of changes in disability scores, all of the tests of hypothesis 1 were statistically significant in the direction that supported the hypothesis.

A correlation matrix, displaying the associations between the outcome variables is given in Appendix XVII.

The descriptive statistics for the schema variables are given in Tables 3.9 to 3.12. Table 3.9 shows the descriptive statistics for participants' own YSQ-SF schema domain scores. Unfortunately, there are no published studies giving norms for these measures and it is therefore impossible to determine how extreme or moderate these score are. As the schema domains are comprised of different numbers of items it is not easy to make comparisons across the 5 sets of scores. However, if the 'Disconnection/Rejection' score is divided by 2.5 (which yields a score of 24.0) and the score for 'Impaired Autonomy' is divided by 2 (producing a score of 20.3) these are then on the same metric as the other three sets of scores. This makes it clear that

the 'Over-vigilance/Inhibition' score is the highest and the 'Impaired Autonomy' score is the lowest of the five sub-scale scores.

Table 3.9 Participant YSQ-SF scores *(all N's = 32).*

Variable name (alpha)	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Discon./Reject. (0.93)	59.9	24.4	0.31	0.41	-1.14	0.81
Imp. Autonomy† (0.91)	40.6	18.2	0.38	0.41	-0.64	0.81
Impaired Limits† (0.78)	24.7	8.1	0.23	0.41	-0.38	0.81
Other-Direct. (0.85)	27.0	9.4	0.28	0.41	-0.65	0.81
Overvig./Inhib. (0.84)	32.1	10.0	0.46	0.41	-0.32	0.81

† These variables were skewed and therefore natural log transformations were used to produce distributions that were approximately normal. The untransformed means and standard deviations, however, are reported here.

Table 3.10 (below) presents the scores for Informant scores for the YSQ-SF.

Table 3.10 Informant YSQ-SF scores *(all N's = 25).*

Variable name (alpha)	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Discon./Reject. (0.93)	59.9	22.2	0.64	0.46	-0.00	0.90
Imp. Autonomy (0.91)	41.2	15.4	0.56	0.46	-0.72	0.90
Impaired Limits† (0.78)	28.4	9.0	0.66	0.46	1.27	0.90
Other-Direct. (0.85)	30.6	10.6	-0.07	0.46	-0.96	0.90
Overvig./Inhib. (0.84)	29.6	9.9	0.18	0.46	-0.54	0.90

† This variables was skewed and therefore a natural log transformation was used to produce a distribution that was approximately normal. The untransformed mean and standard deviation, however, is reported here.

Conducting a similar transformation on the first two informant-reported schema domain scores yields adjusted totals of 24.0 and 20.6, respectively. This suggests that the 'Other-Directedness' score is the highest (with the 'Over-vigilance/Inhibition' score that was highest among the self-reported scores, being slightly less and next highest) and the 'Impaired Autonomy' score also being the lowest of the five sub-scale scores.

Scores on psychologist ratings of the five schema domains are given in Table 3.11.

Table 3.11 Psychologist ratings of the five YSQ-SF domains *(all N's = 54).*

Variable name (alpha)	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Discon./Reject.	2.43	1.02	-0.04	0.32	-0.89	0.63
Imp. Autonomy	1.87	0.97	-0.40	0.32	-0.72	0.63
Impaired Limits[†]	1.70	0.99	-0.48	0.32	-0.78	0.63
Other-Direct.	2.10	0.88	-0.44	0.32	-0.41	0.63
Overvig./Inhib.	2.28	0.96	-0.20	0.32	-0.85	0.63

Interestingly, the pattern of scores in Table 3.11 is unlike that of the self or informant reported YSQ-SF schema domain scores. The highest rating is given to the 'Disconnection /Rejection' domain, whilst the lowest rating is given to the 'Impaired Limits' domain.

The self-reported DAS scores are given in Table 3.12 (below). These scores are all comprised of the same number of items and therefore are easily compared. The highest DAS sub-scale was that measuring the importance of 'Self-control' beliefs whilst the lowest score was found for 'Achievement' beliefs. It is worth noting that the scores achieved by this sample of chronic pain patients are comparable with those

recorded for depressed patients and their relatives and are higher than those from a sample of General Practice patients (Power et al., 1994).

Table 3.12 DAS sub-scale scores *(all N's = 31).*

Variable name (alpha)	Mean	Standard dev.	Skew.	S.E. of skew.	Kurtosis	S.E. of Kurtosis
Achievement (0.89)	27.2	10.7	0.59	0.42	0.31	0.82
Dependency (0.71)	28.7	9.1	0.30	0.42	-0.81	0.82
Self-control (0.77)	31.5	9.1	-0.43	0.42	-0.75	0.82

Further analyses were conducted examining the relationships between these various schema measures. The results are too detailed to go into here but can be found in Appendix XVIII. It is worth pointing out, however, that the associations between the different measures of the same schema domain were often weak and statistically non-significant.

3.2 Relationships between schemata and outcome from the pain management programme (tests of hypotheses 2, 3, 4, and 5)

Examining the associations between the various schema measures and patient outcomes from the pain management programme provided tests of Hypotheses 2, 3, 4 and 5. Because of the small sample sizes, these associations were calculated using Spearman's *rho*. Whether a correlation coefficient is in the direction that supports these hypotheses or not depends on the particular dependent variable in the analysis.

The following list indicates whether it is a positive or a negative correlation that is supportive of the hypotheses.

Dependent variable	Sign that supports the hypotheses 2, 3, 4, and 5.
Pain change	+ve
Self-efficacy change	-ve
BAI change	+ve
BDI-II change	+ve
PSCQ-PC change	+ve
PSCQ-C change	-ve
PSCQ-A change	-ve
PSCQ-M change	-ve
Change walk	-ve
Change sit to stand	-ve
SIP change	+ve
TSK change	+ve

The first test involved examining the relationship between scores on the self-completion YSQ-SF and patient outcomes and provides a test of hypothesis 2 (see Table 3.13). As none of these correlation coefficients were significant at the 0.004 alpha level (indeed, none were statistically significant at the more conventional 0.05 alpha level) hypothesis 2 is rejected.

Table 3.13. The relationship between schema domains on the self-completion YSQ-SF and patient outcomes from the Pain Management Programme

Outcome variable (n's)	Discon./ Reject.	Impair. Auton.	Impair. Limits	Other-Direct.	Overvig. /Inhib.
Pain Change (18)	0.23	0.10	0.07	-0.18	-0.11
Self-Efficacy change (14)	-0.46	-0.34	-0.09	-0.07	-0.12
BAI change (18)	0.03	0.17	0.18	0.26	-0.02
BDI-II change (18)	-0.15	0.22	0.16	-0.40	0.03
PSCQ-PC change (20)	0.20	0.29	0.38	0.03	-0.01
PSCQ-C change (20)	-0.13	-0.22	-0.26	0.01	0.02
PSCQ-A change (19)	-0.01	-0.05	-0.01	0.19	-0.12
PSCQ-M change (19)	0.19	0.15	-0.19	0.15	0.02
Change walk (20)	0.00	-0.04	-0.04	0.18	0.31
Change sit to stand (19)	0.13	-0.15	-0.24	0.16	-0.07
SIP change (21)	0.10	-0.02	-0.12	-0.07	0.18
TSK change (21)	0.14	0.19	0.14	-0.15	0.26
Average correlation	0.06	0.12	0.13	-0.19	0.04

The five average correlation coefficients (weighted by sample size) were all small and did not consistently favour the research hypothesis. A post-hoc power analysis, using the largest of the positively signed coefficients (from the four that favoured the study hypothesis) suggested that a sample size of 372 participants would be needed for this relationship to be statistically significant at the 0.05 alpha level (with a power of 0.9). Of interest is the fact that the same analysis suggested that only 174 participants are required for the single negative correlation to statistically significant at the same power and alpha level.

Next hypothesis 3 was examined by computing the associations between the informant reported YSQ-SF schema domains and the treatment outcome variables were examined. These are presented in Table 3.14.

Table 3.14. The relationship between schema domains on the informant-completion YSQ-SF and patient outcomes from the Pain Management Programme

Outcome variables (n's)	Discon./ Reject.	Impair. Auton.	Impair. Limits	Other-Direct.	Overvig. /Inhib.
Pain Change (15)	-0.16	-0.49	-0.47	-0.36	-0.17
Self-Efficacy change (11)	-0.05	-0.23	-0.32	0.15	0.21
BAI change (12)	-0.05	0.11	0.63	-0.05	0.26
BDI-II change (12)	-0.42	-0.22	-0.03	-0.64*	-0.20
PSCQ-PC change (15)	0.07	-0.40	0.12	-0.72+	0.08
PSCQ-C change (15)	-0.33	-0.03	0.31	0.06	-0.07
PSCQ-A change (15)	-0.09	0.16	0.36	0.18	-0.07
PSCQ-M change (15)	0.14	0.15	0.11	-0.04	0.07
Change walk (15)	-0.34	-0.37	-0.17	-0.05	-0.04
Change sit to stand (13)	0.78+	0.54	0.28	0.50	0.04
SIP change (15)	-0.19	-0.06	-0.01	-0.25	-0.13
TSK change (15)	-0.28	0.08	0.08	-0.48	0.06
Average correlation	-0.08	-0.10	-0.04	-0.27	-0.02

* $p<0.05$, ** $p<0.01$ + $p<0.004$

There are two correlation coefficients that are statistically significant at the more conservative alpha level. However, both of these coefficients were in the opposite direction to that predicted by hypothesis 3. One of these two significant associations found that PSCQ-PC scores were reduced most in those patients who scored most highly on the 'Other Directedness' schema domain of the informant-completed YSQ-SF. The other significant association indicated that higher scores on informant reports of the schema domain of 'Disconnection/Rejection' were associated with a greater degree of gain in the number of sit to stand movements that patients were

able to complete following treatment. Of course, even though these associations were significant at the adjusted alpha level, they were just two out of the sixty that were tested and therefore hypothesis 3 is also rejected.

The average weighted correlation coefficients in this analysis were all negatively signed (that is, in the opposite direction to the hypothesis). Post-hoc power analyses using the largest of these coefficients suggested that a sample size of 104 participants would be needed for this relationship to be statistically significant at the 0.05 alpha level (with a power of 0.9). It is perhaps worth noting that the largest association in this analysis is the same as that in the previous analysis (between the schema domain of 'Other-Directedness' and patient outcome), and both are negatively signed.

Hypothesis 4 was tested by computing the associations between the psychologist ratings of the schema domains and the patient outcome variables (see Table 3.15). This table shows that no relationships were statistically significant at the 0.004 alpha level. The average correlation coefficients in this analysis were so small as to not merit a post-hoc power analysis.

Before rejecting hypothesis 4, these same relationships were examined in a series of partial correlation analyses where the effects of the psychologists' predictions of likely patient outcomes were removed (see Table 3.16). This had the effect of making one of the relationships (between psychologist ratings of the schema domain of 'Impaired Limits' and the TSK) statistically significant at the conservative 0.004 alpha level. However, as in the previous analysis, the coefficient was in the opposite

direction to that predicted by the study hypothesis and, therefore, hypothesis 4 was rejected.

Table 3.15. Correlation coefficients representing the relationship between psychologist ratings of the five schema domains and patient outcomes from the pain management programme.

Outcome variables (n's)	Discon./ Reject.	Impair. Auton.	Impair. Limits	Other-Direct.	Overvig. /Inhib.
Pain Change (35)	-0.31	-0.35*	-0.16	-0.31	-0.39*
Self-Efficacy change (35)	-0.21	-0.15	-0.19	-0.16	-0.21
BAI change (30)	0.22	0.10	0.01	0.04	0.19
BDI-II change (30)	0.18	0.31	-0.12	0.06	0.19
PSCQ-PC change (32)	0.12	-0.02	0.21	0.17	-0.12
PSCQ-C change (33)	-0.12	0.12	-0.18	0.01	0.07
PSCQ-A change (32)	-0.02	-0.09	-0.08	0.21	0.25
PSCQ-M change (32)	0.11	0.11	0.03	0.37*	0.29
Change walk (30)	-0.06	0.09	-0.19	-0.15	0.14
Change sit to stand (31)	0.03	0.06	0.03	-0.03	-0.05
SIP change (35)	0.20	0.01	0.16	0.22	0.15
TSK change (34)	0.03	0.16	-0.39*	0.05	-0.11
Average correlation	0.05	-0.00	0.02	-0.01	-0.06

* $p<0.05$

As found previously, the average correlation coefficients were all small and again it was not felt that these merited a post-hoc power analysis.

Table 3.16. Correlation coefficients representing the relationship between psychologist ratings of the five schema domains and patient outcomes from the pain management programme, adjusted for psychologists' outcome prediction scores

Outcome variables (n's)	Discon./ Reject.	Impair. Auton.	Impair. Limits	Other-Direct.	Overvig. /Inhib.
Pain Change (32)	-0.17	-0.24	-0.04	-0.26	-0.35
Self-Efficacy change (30)	-0.19	-0.18	-0.20	-0.14	-0.15
BAI change (27)	0.06	-0.05	-0.14	-0.02	0.13
BDI-II change (27)	-0.07	0.14	-0.36	-0.02	-0.12
PSCQ-PC change (29)	-0.05	-0.17	0.11	0.12	-0.19
PSCQ-C change (30)	0.05	0.29	-0.07	0.07	0.14
PSCQ-A change (29)	0.03	-0.06	-0.05	0.23	0.28
PSCQ-M change (29)	-0.03	-0.01	-0.09	0.34	0.25
Change walk (27)	0.12	0.26	-0.08	-0.10	0.22
Change sit to stand (28)	0.06	0.09	0.05	-0.02	-0.04
SIP change (32)	0.06	-0.12	0.06	0.18	0.10
TSK change (31)	0.18	0.18	-0.47^{+}	-0.13	0.02
Average correlation	-0.00	-0.05	-0.01	-0.04	-0.11

$^{+}$ $p<0.004$

Finally, hypothesis 5 was tested by computing the relationships between the DAS schemata and the variables measuring patient outcomes from the pain management programme. These results are presented in Table 3.17. This produced one statistically significant correlation coefficient (between the DAS schema of 'Achievement' and the change in the number of sit to stands performed in 2 minutes). Furthermore, the direction of this association indicated that the more strongly patients held these 'Achievement' attitudes the less treatment gains they made in this aspect of physical functioning. More importantly, this association was in line with hypothesis 5. However, as this was one significant association out of the 36 that were tested,

hypothesis 5 is rejected. Furthermore, the average correlation coefficients were all very small, and did not warrant a post-hoc power analysis.

Table 3.17. The relationship between DAS sub-scale scores and patient outcomes from the pain management programme

Outcome variables (n's)	Achievement	Dependency	Self-control
Pain Change (20)	0.07	0.07	0.06
Self-Efficacy change (14)	0.05	-0.14	-0.14
BAI change (17)	0.22	0.17	-0.47*
BDI-II change (17)	0.40	0.38	0.15
PSCQ-PC change (19)	-0.06	-0.32	0.05
PSCQ-C change (20)	0.02	0.16	-0.34
PSCQ-A change (19)	0.25	0.36	-0.11
PSCQ-M change (19)	0.37	0.22	0.32
Change walk (19)	0.17	0.21	0.07
Change sit to stand (19)	-0.65+	-0.49**	-0.28
SIP change (20)	-0.05	0.04	0.05
TSK change (20)	0.06	-0.23	0.17
Average correlation	0.02	-0.04	0.04

* $p<0.05$ ** $p<0.01$ + $p<0.004$

3.3 Further analyses (tests of hypothesis 6)

As these analyses failed to provide support for the study hypothesis, further analyses were conducted to investigate why this might have been the case. It was theorised that this failure to find significant associations between the schema variables and patient outcomes may be due to the large proportion of individuals who failed to complete the follow-up data (and who were therefore excluded from the analysis). It is possible that this depleted sample somehow biased the data in favour of the null hypothesis. For example, it may be that those who failed to complete (and in some

cases, dropped out completely from) the treatment programme, were the individuals for whom the study hypothesis was most true. If this were the case, it would be necessary to demonstrate that these 'non-completers' have high schema scores and also have a poor outcome from the programme. Obviously, it is impossible to test this prediction, as it would require outcome data that are not available. However, it is possible, in some cases, to test the first part of this hypothesis by comparing the schema scores of these individuals with those who did complete the end of programme measures. This was done in two ways. Firstly, the four sets of schema scores (self-complete YSQ-SF and DAS, informant completed YSQ-SF, and psychologist ratings of the YSQ-SF schema domains) of the 'completers' and the 'non-completers' were compared using independent *t*-tests. Secondly, in a more general test, these schema scores were correlated with the number of sessions the patient attended (using Spearman's *rho*, as the number of sessions variable was highly skewed).

Table 3.18. A comparison of scores on the five schema domains from the patients' self-reports, between 'completers' and 'non-completers'

	completers (n=21)		non-completers (n=11)			
	mean	s.d.	mean	s.d.	*t*	*p*
Disconnection/Rejection	57.6	27.1	64.3	18.7	0.73	ns
Impaired Autonomy†	39.8	18.9	42.2	17.7	0.44	ns
Impaired Limits†	23.7	7.03	26.5	10.0	0.75	ns
Other Directedness	26.3	9.96	28.2	8.4	0.52	ns
Over-Vigilance/Inhibition	32.1	9.88	32.0	10.7	0.04	ns

† These variables were transformed using natural log scores as the original variables were skewed

The results did not support this hypothesis. Of the 18 tests of this hypothesis (given in Tables 3.18 to 3.21), only 2 showed statistically significant differences. Both of these concerned DAS sub-scale scores and both were in the opposite direction to that predicted (that is, 'completers' had higher scores than 'non-completers').

Table 3.19. A comparison of scores on the five schema domains from the informants' reports, between 'completers' and 'non-completers'

	completers (n=15)		non-completers (n=10)			
	mean	s.d.	mean	s.d.	*t*	*p*
Disconnection/Rejection	55.8	21.2	66.1	23.4	0.26	ns
Impaired Autonomy	39.9	13.8	43.3	18.11	0.60	ns
Impaired Limits[†]	30.1	10.3	26.0	6.4	1.10	ns
Other Directedness	29.9	10.6	31.7	11.0	0.40	ns
Over-Vigilance/Inhibition	30.6	11.8	26.0	6.4	0.68	ns

[†] This variables was transformed using natural log scores as the original variables were skewed

Table 3.20. A comparison of psychologist ratings of the five schema domains between 'completers' and 'non-completers'

	completers (n=34)		non-completers (n=19)			
	mean	s.d.	mean	s.d.	*t*	*p*
Disconnection/Rejection	2.40	0.98	2.47	1.12	0.25	ns
Impaired Autonomy	1.89	0.99	1.86	0.96	0.10	ns
Impaired Limits	1.63	0.91	1.81	1.12	0.66	ns
Other Directedness	2.00	0.85	2.30	0.92	1.21	ns
Over-Vigilance/Inhibition	2.24	0.90	2.35	1.04	0.42	ns

Table 3.21. A comparison patients' DAS sub-scale scores between 'completers' and 'non-completers'

	completers (n=20)		non-completers (n=11)			
	mean	s.d.	mean	s.d.	*t*	*p*
Achievement	31.1	10.4	20.3	7.5	3.03	0.005
Dependency	29.9	9.9	26.5	7.4	-0.98	ns
Self-control	34.1	7.6	26.6	9.8	2.37	0.025

It could also not be demonstrated that the number of treatment sessions attended was significantly related to any of the four sets of schema data (see Table 3.22).

Finally, It was hypothesised that those patients who did not complete the YSQ-SF and DAS self-completion questionnaires may also have been the individuals with the highest levels of dysfunctional schemata. If this was the case, it may have biased the results against finding significant relationships between the YSQ-SF/DAS and patient outcomes. This possibility was investigated by comparing the psychologist ratings of the five schema domains across the two groups of patients who completed the self-report schema data. The results are presented in Table 3.23. This series of independent *t*-tests revealed only one statistically significant difference. On this occasion this supported the hypothesis that those who failed to take part in the study had higher schema domain scores (in this case they scored more highly on the domain of 'Impaired Limits'.

Table 3.22. The relationships between schema scores and the number of pain management programme sessions that patients attended

Number of sessions attended	Discon./ Reject.	Impair. Auton.	Impair. Limits	Other-Direct.	Overvig. /Inhib.
Self-complete YSQ-SF (n=29)	-0.22	-0.14	-0.03	-0.10	0.10
Informant YSQ-SF (n=26)	0.19	0.24	0.02	0.27	0.10
Psychologist ratings (n=54)	-0.19	-0.01	-0.10	0.24	0.16

	Achievement	Dependency	Self-control
DAS (n=30)	-0.13	-0.25	-0.18

Table 3.23. A comparison of psychologist ratings of the five schema domains between self-reported YSQ-SF 'completers' and 'non-completers'

	completers (n=30)		non-completers (n=23)			
	mean	s.d.	mean	s.d.	*t*	*p*
Disconnection/Rejection	2.36	0.99	2.48	1.01	0.44	ns
Impaired Autonomy	1.96	0.92	1.80	1.03	0.85	ns
Impaired Limits	1.46	0.95	1.90	0.99	2.34	0.023
Other Directedness	2.08	0.80	2.14	0.97	0.27	ns
Over-Vigilance/Inhibition	2.23	0.81	2.34	1.09	0.35	ns

Taken all together, these results find very little support for hypothesis 6 and therefore it is rejected.

CHAPTER 4

DISCUSSION

4.1. Discussion of results.

This study failed to find consistent evidence that dysfunctional schemata were related to patient outcomes from a pain management programme. Before discussing why this might have been the case, it is worth recapping the results and examining the few significant associations that were found.

The patients' own self-reports of the five YSQ-SF schema domains were not statistically significantly related to any of the 12 outcomes from the treatment programme. When it came to the informant's reports of the schema domains, only two of these were reliably associated with the patients' outcomes, and both of these were in the direction opposite to that which was hypothesised. The first of these two significant associations was that between 'Other Directedness' and changes in PSCQ pre-contemplation scores. The pain management programme aims to move individuals on from the stage of pre-contemplation, to thinking about, and actively changing, their behaviour. Consequently, successful engagement with the programme should see a reduction in pre-contemplation scores on the PSCQ. The large inverse association that was found suggested that these scores were reduced most in those patients who, according to their family member of friend, were excessively focused on the wishes and desires of others. Whilst it is important to remember that this was one of only a few significant associations found out of many

that were tested, this was a large association that met the more stringent requirements of the alpha level that was adjusted using Bonferroni's correction. Furthermore, it is not difficult to produce a post-hoc rationalisation for this finding. It is possible to argue that those individuals who scored highly on 'Other-Directedness' were also those who were most open to social influences, like those coming from the therapists in the group programme. For example, the patients in the pain management groups would have been fully aware of the attitudes of the group facilitators towards the self-management of pain. Therefore, patients who were overly concerned with the happiness of others may have endorsed fewer pre-contemplation items in order to satisfy their therapists.

The other significant association between informant reports of patients' schemata and outcome was that between 'Disconnection/Rejection and changes in the number of sit to stand movements made in two minutes. This was a large, positive, association, which suggests that those highest in this schema show the greatest improvements in this aspect of physical functioning. Individuals who score highly on this schema domain are thought to hold the belief that their needs for safety will not be met in a reliable way. As, it is thought that these individuals see others as untrustworthy, it is surprising that they appear to make gains in this area of physical functioning, when it is probably important to trust the therapist that these gains can be made without putting oneself at risk of further injury. One possibility is that these patients strive to make tangible gains in order to avoid rejection from therapists who they may perceive as critical and judgmental. However, this is a post-hoc speculation for what may simply be a chance finding.

The next set of analyses involved the association between the psychologists' ratings of the YSQ schema domains and patients' outcomes. In the bivariate analyses, none of these associations were statistically significant. However, when the effects of the psychologists' ratings of the patients' likely outcome were partialled out, one association became statistically significant. This was the association between the schema domain of 'Impaired Limits' and change in the patients' fear of injuring or re-injuring themselves, as measured by the difference in pre and post-group scores on the TSK. This schema domain is theorised to be concerned with a sense of entitlement and insufficient self-control or self-discipline. This association is interesting because Young and Behary (1998) have suggested that individuals who hold this belief are likely to have had a childhood where they were not pushed to tolerate discomfort. If this suggestion were true it might also be reasonable to expect these individuals to have high TSK scores, the reasoning being that their avoidance of discomfort in early life may have also led them to fear pain. Indeed a post-hoc analysis reveals that the psychologist ratings of this domain are positively and significantly associated with both pre and post-group TSK scores (0.39, n=49, $p<0.01$ and 0.45, n=35, $p<0.01$, respectively). These significant associations suggest that this schema domain may be confounded with the TSK variable that is used to measure patients' outcomes. Furthermore, it may also help to explain why the association between this schema domain and reductions in TSK scores, which is in the direction that is counter to that hypothesised, was a significant one. This kind of confounding of independent and dependent variables can sometimes lead to unexpected findings. In this case, the suggestion that this association may be

spurious is given further support by the fact that high pre-group TSK scores are associated with the greatest reduction in TSK scores following treatment (-0.37, $n=37$, $p<0.05$, see the correlation matrix of dependent variables in Appendix X). This association, between pre-group TSK scores and changes in TSK scores, may simply be due to the fact that there is more room in which to make reductions when scores are high to begin with. When all of these points are taken together, it is possible to argue that the association between 'Impaired Limits' and TSK reductions may be due to the fact that these variables may, in some part, be measuring the same thing.

The final statistically significant association between schemata and outcome from the pain management programme was between the DAS measure of 'Achievement' beliefs and change in the timed number of sit to stand movements. This association was in the direction predicted by the hypothesis, in that the more that the participants held the belief that success is important, the less gain they made in this aspect of their physical performance. In the introduction it was hypothesised that individuals who held these achievement beliefs would find it difficult to adopt a pacing approach. It was theorised that such persons would be uncomfortable at taking a slow and measured approach to attaining their goals, as they might interpret partial success as indicating failure. Furthermore, it was suggested that any setbacks during treatment would be perceived as a sign of failure, and that this perception might undermine their motivation to engage with the treatment process. However, this rationale should also apply to progress in the number of yards walked following treatment. As this wasn't significantly associated with the 'Disconnection/Rejection' schema domain it must undermine the credibility of this single significant association.

It is also important to consider this single success against the background of the general failure of the hypothesis. If the hypothesis is correct, then there should have been more significant associations in these analyses. Generally, when a hypothesis is rejected, as this one surely must be given the overall lack of support, this can mean only one of two things. It may mean that the hypothesis is incorrect, or it may be that the design of the study is flawed in ways that prevent the truth of the hypothesis from being detected. Section 4.2 (below) will examine what substantive factors may have been at work that could have undermined the hypothesised mechanisms. Following that discussion, possible flaws in the study design, that may have prevented the hypothesised relationships being found, will be examined.

Before examining the merits of the hypothesis and problems with the study design, another aspect of the results is worth examining. This study employed the patients' own self-reports, the reports of informants (a family member or friend) and psychologist ratings, as measures of the YSQ schema domains. It will have been clear from the results described above that none of these measures stood out as being more strongly related to patient outcome than were any other. This finding could be the result of a number of processes. One reason that no measure outperformed any other could be that they were all measuring the same thing. However, this explanation is undermined by the fact that there was a general lack of association between these different measures of the schema domains. There are fifteen correlation coefficients that represent the associations between the three sets (self, informant and psychologist ratings) of schema domain measures (see Appendix X).

Of these fifteen, only two are statistically significant at the 0.05 alpha level. This poor level of agreement between these different measures suggests a further two possibilities. It may suggest that the different sources for the schema domain ratings were producing ratings that were not measures of the same concepts. That is, these ratings were invalid because they were systematically biased. Some evidence that supports this explanation is the fact that the psychologists' ratings were correlated with their predictions of the patients' likely outcome from treatment. This suggests that, in the psychologists' minds, there was a confounding between the schema domains and patients' likely treatment success. Unfortunately, no further information was collected from the family and friend informants and so no such biases could be examined within their ratings. An alternative explanation is that the three different raters were in fact making ratings of the same concepts, but that they were simply not doing so with any real degree of accuracy. There was some evidence that this might have been the case with the psychologists' ratings in that the inter-rater reliability estimates (presented in Table 2.3) were not impressive. It should be remembered that the psychologists were asked to make ratings of complex schema domains, but were limited by only having five single items on which to make these judgements. As regards the patients' own and their informants' responses, one possible reason why these were only weakly associated with each other may be that the general public are not very astute judges of peoples' personalities. Asking three different groups to make ratings of an individual's personality and cognitive structures was an attempt to counter the possible biases that are felt to be present in studies that rely solely on self-reports. Unfortunately, because of possible weaknesses in these measures

(problems with the YSQ-SF will be discussed later, see Section 4.3) this approach was not very fruitful.

4.2. A critical examination of the study hypothesis.

In the Introduction there were a number of suggestions concerning how the dysfunctional schemata that were the focus of this study might interfere with rehabilitation. This section will examine whether or not it is possible that these schemata might actually aid some patients, in some circumstances, in their rehabilitation. One set of beliefs that might increase a patient's own self-management efforts are those associated with the 'Over-vigilance/Inhibition' schema domain of the YSQ-SF and the Achievement sub-scale of the DAS. Both of these sets of belief concern the strength with which a person values achievement and how unwilling they are to tolerate a poor performance from themselves. The Introduction spelt out how these might be dysfunctional in a treatment setting, such as a pain management programme that emphasised a paced approach to recovering functionality. However, it is reasonable to suggest that people who hold these convictions might be driven to strive for success in the face of adversity. On the other hand, others who do not possess these beliefs might give up with treatment if it becomes difficult. Clearly, if both these processes operate, the net result would be that individuals with strong achievement beliefs would obtain an outcome that was roughly equal to those without these beliefs.

A similar logic could be employed to argue that those who have the belief that they cannot cope alone (as measured by the Dependency sub-scale of the DAS and the 'Impaired Autonomy and Performance' sub-scale of the YSQ-SF) might do particularly well in a group treatment programme. It could be argued that such individuals might perceive the group environment as supportive and therefore flourish. Unfortunately, it is all too easy to produce, in this post-hoc fashion, a whole set of counter-arguments that posit mechanisms that work in the direction opposite to that hypothesised in the Introduction to this study. If there are competing processes at work, some of which being helpful to rehabilitation and others damaging, then treatment process research might be one way of uncovering them. However, given that this study suggests that these schemata are not harmful to patients' outcome from pain management, then it would not seem necessary to conduct such a study. Unless, that is, this study failed because there are design problems with the study that if corrected would lead to a more favourable outcome for the hypothesis.

There is another explanation as to why this study failed and it is one that might undermine the whole rationale on which this investigation was based. This alternative explanation is derived from the work that has examined the role that dysfunctional schemata play in the development of psychological disorder. These schemata were originally conceptualised as being vulnerability factors for the development of depression (Beck, 1967; Weissman, 1979). Supporting this argument have been studies reporting higher levels of these beliefs among depressed individuals (for example, Nelson, Stern and Cicchetti, 1992). However, the early optimism about the predictive and explanatory value of these hypothesised

vulnerability factors has been damaged by the finding that, following treatment, the levels of dysfunctional beliefs usually return to that found in comparison controls (see Power, 1990, for a review). This has led to a great deal of debate about whether scores on these measures actually represent an individual's stable beliefs or whether they are more indicative of a person's current emotional state (Charlton and Power, 1995).

This same kind of debate has not taken place about those beliefs that are thought to be related to the Axis II disorders. This is understandable, as these disorders are concerned with an individual's personality, which by most definitions is regarded as stable. Reassuringly, in the chronic pain literature there has been some discussion about whether the high levels of personality disorder that is found in this population is truly reflective of long-standing problems in this group. Weisberg, Vittengl, Clark, Gatchel and Gorin (2000) note that "patients with pain, and their significant others, often present a very different description of the patient's pre-morbid (before pain onset) personality function from that observed after the onset of pain." (p. 260). They suggest that these reports should undermine the diagnosis of an Axis II disorder, but that it in practice they rarely do. This clinical impression raises questions about how stable the dysfunctional schemata that were studied here might be in pain patients who were being treated. One suggestion might be that, as in depression, treatment could moderate the dysfunctional schemata of patients who have chronic pain. If this process took place in this sample, it might dissipate the processes that were hypothesised as likely to interfere with responses to treatment. A future study might

profit from examining dysfunctional schemata at the end, as well as at the beginning, of treatment.

4.3. A critical examination of the study design.

Most often when a study fails to detect a significant effect the authors will point out that the sample size was small and that the tests that were used may, therefore, have been under-powered. Certainly, in this instance, the sample sizes in the various tests were small and, in some analyses, very small. However, as has already been pointed out, the average effect sizes (expressed as average correlation coefficients) were, with one exception, small. This single exception involved the average correlation coefficient (of r=-0.27) between the patient-completed YSQ-SF measure of 'Other-Directedness' and patient outcome. According to Cohen (1977) a correlation coefficient of 0.3 would be described as a moderate effect size, and this particular coefficient is nearly of that magnitude. However, this association was in the direction opposite to that predicted. The average correlation coefficients that had a positive sign (that is, they favoured the hypothesis) were, in the majority of cases, so small as to require samples numbering in their thousands in order for there to be a good chance of them being found to be statistically significant. Clearly, the clinical importance of such small effects would not merit this research being conducted with these much larger samples. In summary, the findings of the post-hoc power analysis would suggest that this study did not fail because of the small sample sizes. It failed because the associations were either not there to be detected, or they were so small as to be unimportant.

However, there are other aspects of the study design that could have caused the hypothesis to be rejected. One of these potential problems was the numbers of patients who, for one reason or another, did not complete all the study measures. There were a number of potential study participants whose outcome from treatment could not be judged because they did not complete the measures at the start of the group programme. There was a further loss of participants due to individuals dropping out of the programme. Some of these were in the early stages of treatment and had left the group before the psychologists had got a chance to get to know them, and therefore they were unable to make a proper assessment of their schemata. There was also a loss of participants from those who failed to complete the end of group outcome measures and whose outcome from treatment could not be ascertained. A final group, whose responses could not be analysed, consisted of those who chose not to complete the measures of dysfunctional schemata or to pass the informant questionnaires on to a relative or friend. All of these losses of potential study participants could have biased the sample in a number of ways. For example, it is reasonable to speculate that those who dropped out of treatment may have done so because they realised that the treatment was not benefiting them. If this were the case, it would have biased the remaining sample of patients so that those who were included in the study were more likely to be treatment responders. This would have had the consequence of restricting the variance in the measures of treatment outcome, and generally made it more difficult to find factors that were significantly associated with these measures. This supposition is impossible to test retrospectively. However, one possible solution to this problem, were the study to be repeated, is to

attempt to collect outcome measures from those who dropped out of treatment at around the same time point as those who continued with treatment were completing the programme.

Another way in which the loss of study participants may have affected the study is if those who dropped out, or who didn't complete the study measures, were individuals whose scores on the measures of dysfunctional schemata differed from those who took part in the study. Young's model, of how these dysfunctional schemata operate, suggests mechanisms through which this bias in the sample might potentially have come about. Young (1990) describes three sets of, what he calls, schema processes. These processes are styles of coping that have theoretical links with psychoanalytic concepts such as resistance and defence mechanisms. Two of these might be particularly relevant for understanding why some individuals, with strongly held beliefs from the schema domains, might not complete all aspects of their treatment. One of these processes is 'schema avoidance'. It refers to the individual's attempts to prevent the painful schema being triggered by avoiding situations where this is likely to happen. He gives the example of a patient with a 'Failure' schema, who avoids starting on a project because they believe that they might receive a poor evaluation (Young and Behary, 1998). Another process described by Young is 'schema maintenance'. This is where individuals give full rein to their schemata, but this process ultimately involves these beliefs being reinforced. Young and Behary (1998) give the example of a patient with the 'Defectiveness' schema who selects a partner who is critical and demeaning of them, thereby reinforcing their belief that they are unlovable and flawed.

Examples of how these schema processes that might have been at work in this sample follow next. The first of these involves holding the belief that others are unreliable (this is hypothesised to be a part of the Disconnection/Rejection schema domain). This may lead patients to mistrust their therapists and to be wary of other patients in the group. This distrust may lead them to drop out of treatment or to doubt the motives of those who ask them to complete questionnaires. It could also be argued that those patients who hold the belief that they must not make any mistakes (hypothesised to be part of the 'Overvigilance/ Inhibition' schema domain of the YSQ-SF and also part of the 'Achievement' attitudes of the DAS) might also drop out of treatment. Such individuals may, for example, find it difficult to tolerate a treatment situation where there is the potential for their mistakes to be exposed publicly and who would rather forgo treatment than run this risk. Similarly, it could be argued that these individuals might also be reluctant to complete questionnaires, also because they fear making mistakes. Those patients that score highly on the schema domain that Young calls 'Impaired Limits' may also be more likely to drop out of treatment. This is best illustrated by reference to a specific item from this schema domain. Item 72 (see Appendix X) has the statement, 'If I can't reach a goal I become easily frustrated and give up'. It could, therefore, be hypothesised that these individuals would struggle with the slow progress that the pacing approach entails. These same individuals might also not complete long and boring questionnaires (see item 71 of the YSQ-SF). Finally, the belief that one should always be in control of one's emotional responses (a belief that is a central part of the 'Self-control' attitudes of the DAS measures) may also be relevant. Such a belief may make it difficult to

tolerate the strong feelings that can be invoked during the group treatment process, and may therefore make it more likely for such a person to drop out.

In some cases it was possible to examine these speculations. The Results section (3.3) gives the outcome of a series of further analyses. These analyses set out to examine the extent to which individuals who did not complete the treatment programme, or who failed to complete all of the questionnaires, differed in terms of their schemata from those who provided full data sets for the study. These results suggested that there was little evidence for these hypothesised mechanisms. Comparisons involving the three sets of YSQ schema domain measures (self-report, informant-report and psychologist ratings) did not differ between those who completed treatment and those who did not. Nor did they differ between those who did and those who did not complete the outcome measures that were taken during the final group session. However, there was one significant difference between those who failed to complete YSQ-SF and those who did. Those who didn't complete this measure were judged by the psychologists to be significantly higher in the 'Impaired Limits' schema domain. It is possible to interpret this result as being in line with the schema processes proposed by Young (1990). That is, having the belief that one is incapable of completing boring tasks, such as completing a lengthy questionnaire, may lead the individual to not attempt the questionnaire (schema avoidance), or to attempt it and to then give up halfway through (schema maintenance).

The analyses involving the DAS sub-scales revealed two further significant differences between 'completers' and 'non-completers'. However, both of these were

in the direction opposite to that predicted. Those who provided a full set of outcome measures for the study had significantly higher scores on the 'Achievement' and 'Self-control' sub-scales of the DAS than did those who failed to complete the end of treatment measures. These two findings might not have been totally unexpected. A post-hoc rationale might be that schema maintenance processes could work to ensure that patients did complete all aspects of their treatment. For example, it might be possible to reinterpret these results as showing that those who have strong 'Achievement' beliefs will complete every aspect of their treatment, as to do otherwise might indicate to them that they have failed to keep to their own high standards. Similarly, individuals who have strong beliefs about the importance of self-control may continue with a treatment process that is making them uncomfortable because to do otherwise would indicate to theme that they have failed to maintain control over their feelings. These findings highlight how difficult it is to predict the responses of individuals, who have certain schemata, in any given situation.

Apart from the potential biases that could have been introduced by patients not providing full data sets, there was another, possibly quite large, influence on the study's outcome. Entry to the group programme is always preceded by an assessment interview. In 1996, an audit of the pain management service where the research was conducted found that the majority of patients (58 per cent) go straight to the group programme (Stuckey, 1996). Twenty four per cent of patients were deemed to be unsuitable for treatment or where uninterested in the treatment that was offered. The remainder of the patients who were assessed (18 per cent of the total) were provided

with an individual treatment programme. The analysis of the reasons why some patients were allocated to individual, rather than group, treatment are worth noting. Approximately five per cent of patients received individual treatment because of 'personality problems'. Another fifteen per cent had individual therapy because they were anxious or depressed, and a further twenty two per cent because of unspecified 'psychological issues'. As will be clear from this breakdown, a significant number of patients have psychological problems of one kind or another but, because they receive an individual treatment programme, they do not join the pain management groups.

This process means that the pain patients who received group treatment were a selected sub-sample of all of those that were referred for treatment. This selection process might have biased the study against finding significant effects of dysfunctional schemata on patient outcomes. One way in which it might have done this is if the patients who received individual treatment had higher levels of dysfunctional schemata than those who received group treatment. It is reasonable to suggest that this might have been the case, particularly as the audit of the pain management service suggested that some patients with 'personality problems' were offered individual, rather than group, treatment. Those who were selected out of group treatment because of anxiety/depression or other 'psychological issues' may also have had high levels of these schemata. The net effect of this selection process might have been to make the group patients more homogeneous in terms of their schemata. This reduction in the degree of variability in patients' schemata might have hampered the chances of finding significant associations between these beliefs and

the patients' outcomes. A future study might profit from including those patients who had an individual programme along with those who had group treatment, in order to examine whether this greater heterogeneity yields more support for the study hypothesis.

Before concluding it is worth commenting on the methods by which dysfunctional schemata were assessed in this study. This study was unusual because it did not just rely on patient's own self-reports, rather it obtained reports from informants drawn from the patient's social network and included ratings of these schemata made by psychologists. This extra effort was made because there have been a number of doubts raised about the validity of self-report questionnaires. In the Introduction, the literature on self-enhancing biases in self-reports was discussed and prompted the inclusion of informant reports. Others have suggested that questionnaire measures can never accurately capture cognitive vulnerabilities to depression as they are often too general and can be tainted by current mood states, such as dysphoria, happiness or dissatisfaction (Andrews and Brown, 1993). As well as having these potential problems, the design of the YSQ-SF raises other concerns. First of all is its length. Although much shorter than the long-form, at 75 items it is still a long questionnaire. When faced with the task of filling it in, the patients, who were also being asked to complete a number of other questionnaires as part of their treatment, may well have been put off by the questionnaire's length. It is possible that the size of the YSQ-SF may have dissuaded some potential study participants from taking part. Those who did complete the YSQ-SF may easily have become bored or irritated by it and, consequently, they may not have given it the same attention as they would have

given to shorter questionnaires. Another factor is the structure of the questionnaire. The questionnaire yields 15 schemata and five schema domains. Each schema score is calculated from five items that are adjacent to each other (with the schema domain scores being computed from various combinations of individual schema scores). That is, the first schema score is calculated from the first five items, the next schema score from the following five items, and so on. This organisation increases the chances that the person filling in the YSQ-SF will quickly form an impression of what kind of information the researcher is seeking. This may result in an individuals answers being derived from some form of 'response set', whereby the content of particular items may be ignored by the participant who may have generated their own ideas about what the question is 'really' after. This problem may be compounded by the fact that all of the items are phrased in same direction (that is, no items are scored inversely). However, it should be pointed out that the alternative, where questionnaires contain a mixture of positive and negatively valenced questions, can cause confusion instead (Dunbar, Ford, Hunt and Derr, 2000). The fact that the estimates of internal consistency for these schema scores are generally very good may be evidence that they were generated as part of a 'response set'. If these processes were taking place, it would have obscured the patients' true schemata, making it less likely to find support for the study hypothesis. These concerns were one reason why the DAS was employed alongside the YSQ-SF. At only 24 items it is relatively short. Furthermore, the items representing the three sub-scales are distributed throughout the questionnaire and some of them are scored inversely. As the DAS did not perform any better than the YSQ-SF in predicting patients' outcomes, it could be argued that it was not the design faults of the YSQ-SF that

explain why the hypothesis failed. However, there is only a moderate degree of conceptual overlap between the YSQ schema domains and the DAS sub-scales, which leaves open the possibility that if the YSQ-SF had been a better instrument it might have been more strongly related to patient outcome.

CONCLUSION

This study examined the hypothesis that dysfunctional schemata are associated with variations in patients' outcomes from a pain management programme. The results generally did not support the study hypothesis. Only four associations, out of a possible 216, were statistically significant (at the adjusted alpha level) and only one of these was in the direction predicted. In an attempt to counter various criticisms of self-report measures of cognitive vulnerability, dysfunctional schemata were also assessed through informant reports and clinical ratings. However, the results produced by these different measures did not differ greatly.

Various explanations were put forward to explain the lack of support for the study hypothesis. These explanations included suggestions that these dysfunctional schemata might actually aid patients in their rehabilitation. It was also suggested that scores on these measures of schemata might respond to the treatment provided by the pain management programme in such a way as to reduce post-treatment variations between patients. Various aspects of the study design were also examined as potential sources of explanation for the null results. The sample size used in this study was small. However, the average effect sizes produced by the study were small and likely to be clinically unimportant. Furthermore, post-hoc power analyses suggested that very large samples would have been required to detect the small effects that were demonstrated here. A number of potential study participants were not included in the final sample. This was because they either because they dropped-out of treatment or because they did not complete all of the study measures. It was

possible to conduct some analyses of the schema characteristics of these 'non-completers'. This analysis suggested that they were similar to those who completed the study and that this loss of participants was unlikely to be a major threat to the study's conclusions. A more likely explanation is that the patients who receive group, as opposed to individual, treatment, are selected on the basis that they have, relatively, few psychological problems. This may have had the consequence of increasing the homogeneity of the group patients, both in terms of their levels of dysfunctional schemata and their outcome from treatment. A final threat to the study was the use of the YSQ-SF as the main measures of dysfunctional schemata. This measure was criticised for its simple structure that was felt to contain demand characteristics that may have produced a response set that obscured the participant's true schemata scores.

A number of suggestions were made to improve the design of the study, including obtaining outcome measures from study drop-outs and 'non-completers', examining the response of those patients who were provided with an individual pain management programme, and improving the YSQ-SF so as to reduce its demand characteristics.

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We would appreciate you responding to the questions below and to the attached questionnaires. This information will help us to understand more about your experience of chronic pain.

Please check you complete ALL questions on BOTH sides - Thank you

1. Sex: **Male** **Female** (please circle)

2. How long have you experienced pain? (please circle)

Up to:	**2 years**	**4 years**	**6 years**
	8 years	**10 years**	**10+ years**

3. Do you currently receive benefits? **Yes** **No** (please circle)

If yes, please list below:

4. Are you currently working? (please circle)

Yes, full time paid work **Yes, part time paid work** **Yes, doing voluntary work**

No, because of pain **No, not because of pain** (eg. student, homemaker etc)

5. How many bad pain days have you had in the past week? _____

6. How intense has the pain been on average over the past week on a scale of **0 to 10** where **0** is not intense and **10** is extremely intense? _____

7. How distressing has the pain been on average over the past week on a scale of **0 to 10** where **0** is not distressing and **10** is extremely distressing? _____

8. How many visits have you had to your GP in the past three months because of pain? _____

9. How many emergency call outs to your GP have you had in the past three months because of pain? ___

10. Do you have any ongoing legal proceedings which are related to your chronic pain?

Yes **No** (please circle)

11. Are you currently living alone? **Yes** **No** (please circle)

Appendix II: Self-Efficacy scale

PAIN: S-E QUESTIONNAIRE

APPENDIX D

MKN (1988) Pain Management Centre
St Thomas' Hospital London.

NAME:_____ DATE_____

Please rate how confident you are that you can do the following things at present, despite the pain. To answer circle one of the numbers on the scale under each item, where 0 = "Not at all confident" and 6 = "Completely confident"

FOR EXAMPLE:-

0 1 2 (3) 4 5 6
Not at all Confident — Completely Confident

Remember, this questionnaire is not asking whether or not you have been doing these things, but rather, how confident you are that you can do them at the present, despite the pain.

1) I can still enjoy things, despite the pain.

0 1 2 3 4 5 6
Not at all Confident — Completely Confident

2) I can still do most of the household chores (e.g. tidying up, washing dishes etc.) despite the pain.

0 1 2 3 4 5 6
Not at all Confident — Completely Confident

3) I can socialise with my friends or family members as often as I used to, despite the pain.

0 1 2 3 4 5 6
Not at all Confident — Completely Confident

4) I can cope with my pain in most situations.

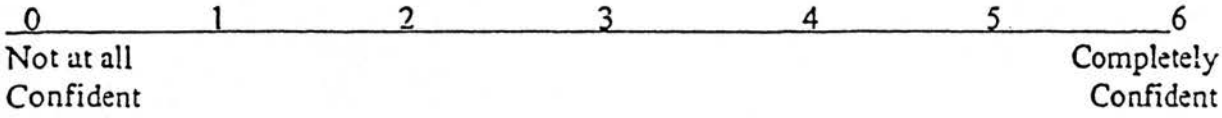
0 1 2 3 4 5 6
Not at all Confident — Completely Confident

5) I can do some sort of work, despite the pain
("Work" includes housework, paid or unpaid work)

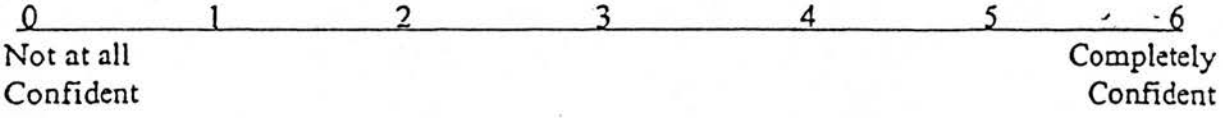
0 1 2 3 4 5 6
Not at all Confident — Completely Confident

Turn over the page.

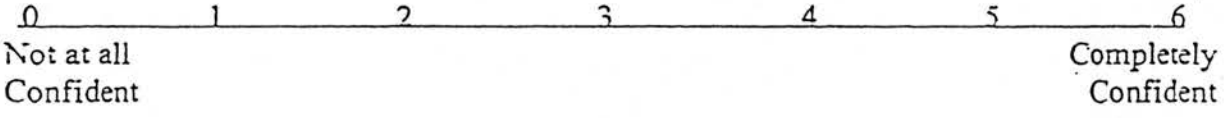
6) I can still do many of the things I enjoy doing, such as hobbies or leisure activities, despite the pain.



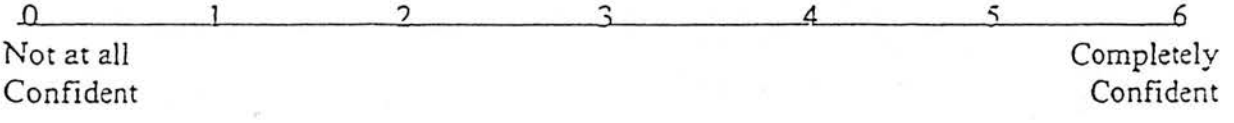
7) I can cope with my pain without medication.



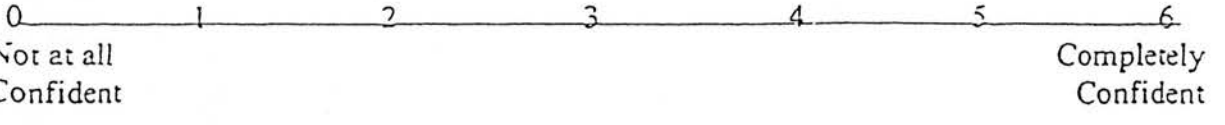
8) I can still accomplish most of my goals in life, despite the pain.



9) I can still live a normal lifestyle, despite the pain.



10) I can gradually become more active, despite the pain.



)ate:

Marital Status: _____ Age: _____ Sex: _____

tion: _____ Education: _____

tions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and ck out the **one statement** in each group that best describes the way you have been feeling during the **past two including today**. Circle the number beside the statement you have picked. If several statements in the group apply equally well, circle the highest number for that group. Be sure that you do not choose more than one nt for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

dness

I do not feel sad.

I feel sad much of the time.

I am sad all the time.

I am so sad or unhappy that I can't stand it.

ssimism

I am not discouraged about my future.

I feel more discouraged about my future than I used to be.

I do not expect things to work out for me.

I feel my future is hopeless and will only get worse.

st Failure

I do not feel like a failure.

I have failed more than I should have.

As I look back, I see a lot of failures.

I feel I am a total failure as a person.

ss of Pleasure

I get as much pleasure as I ever did from the things I enjoy.

I don't enjoy things as much as I used to.

I get very little pleasure from the things I used to enjoy.

I can't get any pleasure from the things I used to enjoy.

lty Feelings

I don't feel particularly guilty.

I feel guilty over many things I have done or should have done.

I feel quite guilty most of the time.

I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.

1 I feel I may be punished.

2 I expect to be punished.

3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.

1 I have lost confidence in myself.

2 I am disappointed in myself.

3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.

1 I am more critical of myself than I used to be.

2 I criticize myself for all of my faults.

3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.

1 I have thoughts of killing myself, but I would not carry them out.

2 I would like to kill myself.

3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.

1 I cry more than I used to.

2 I cry over every little thing.

3 I feel like crying, but I can't.

Subtotal Page 1

Continued on Back

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gitation

I am no more restless or wound up than usual.

I feel more restless or wound up than usual.

I am so restless or agitated that it's hard to stay still.

I am so restless or agitated that I have to keep moving or doing something.

oss of Interest

I have not lost interest in other people or activities.

I am less interested in other people or things than before.

I have lost most of my interest in other people or things.

It's hard to get interested in anything.

decisiveness

I make decisions about as well as ever.

I find it more difficult to make decisions than usual.

I have much greater difficulty in making decisions than I used to.

I have trouble making any decisions.

rthlessness

I do not feel I am worthless.

I don't consider myself as worthwhile and useful as I used to.

I feel more worthless as compared to other people.

I feel utterly worthless.

s of Energy

I have as much energy as ever.

I have less energy than I used to have.

I don't have enough energy to do very much.

I don't have enough energy to do anything.

nges in Sleeping Pattern

I have not experienced any change in my sleeping pattern.

I sleep somewhat more than usual.

I sleep somewhat less than usual.

I sleep a lot more than usual.

I sleep a lot less than usual.

I sleep most of the day.

I wake up 1–2 hours early and can't get back o sleep.

17. Irritability

0 I am no more irritable than usual.

1 I am more irritable than usual.

2 I am much more irritable than usual.

3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.

1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.

2b My appetite is much greater than usual.

3a I have no appetite at all.

3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.

1 I can't concentrate as well as usual.

2 It's hard to keep my mind on anything for very long.

3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.

1 I get more tired or fatigued more easily than usual.

2 I am too tired or fatigued to do a lot of the things I used to do.

3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I am much less interested in sex now.

3 I have lost interest in sex completely.

3 4 5 6 7 8 9 10 11 12 A B C D E

Subtotal Page 2

Subtotal Page 1

Total Score

Beck Anxiety Inventory

Name_____ Date_____

Below is a list of common symptoms of anxiety. Please read each item in the list carefully. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY by placing an **X** in the corresponding space in the column next to each symptom.

		Not at all	Mildly It did not bother me much	Moderately It was unpleasant but I could stand it	Severely I could barely stand it
1	Numbness or tingling				
2	Feeling hot				
3	Wobbliness in legs				
4	Unable to relax				
5	Fear of the worst happening				
6	Dizzy or lightheaded				
7	Heart pounding or racing				
8	Unsteady				
9	Terrified				
10	Nervous				
11	Feelings of choking				
12	Hands trembling				
13	Shaky				
14	Fear of losing control				
15	Difficulty breathing				
16	Fear of dying				
17	Scared				
18	Indigestion or discomfort in abdomen				
19	Faint				
20	Face flushed				
21	Sweating (not due to heat)				

PSCQ

This questionnaire is to help us better understand the way you view your pain problems.
Each statement describes how you may feel about this particular problem. Please indicate the extent to which you tend to agree or disagree with each statement. In each example, please make your choice on **how you feel right now**, not how you have felt in the past or how you would like to feel.

Circle the response that best describes how much you agree or disagree with each statement.

Strongly Disagree **1 2 3 4 5** Strongly Agree

1. I have been thinking that the way I cope with my pain could improve.	**1 2 3 4 5**
2. I am developing new ways to cope with my pain.	**1 2 3 4 5**
3. I have learned some good ways to keep my pain problem from interfering with my life.	**1 2 3 4 5**
4. When my pain flares up, I find myself automatically using coping strategies that have worked in the past, such as relaxation exercise or mental distraction technique.	**1 2 3 4 5**
5. I am using some strategies that help me better deal with my pain problem on a day to day basis.	**1 2 3 4 5**
6. I have started to come up with strategies to help myself control my pain.	**1 2 3 4 5**
7. I have recently realised that there is no medical cure for my pain condition, so I want to learn some ways to cope with it.	**1 2 3 4 5**
8. Even if my pain doesn't go away, I am ready to start changing how I deal with it.	**1 2 3 4 5**
9. I realise now that it is time for me to come up with a better plan to cope with my pain problem.	**1 2 3 4 5**
10. I use what I have learned to keep my pain under control.	**1 2 3 4 5**
11. I have tried everything that people have recommended to manage my pain and nothing helps.	**1 2 3 4 5**
12. My pain is a medical problem and I should be dealing with physicians about it.	**1 2 3 4 5**
13. I am currently using some suggestions people have made about how to live with my pain problem.	**1 2 3 4 5**
14. I am beginning to wonder if I need to get some help to develop skills for dealing with my pain.	**1 2 3 4 5**

Strongly Disagree **1 2 3 4 5** Strongly Agree

15. I have recently figured out that it is up to me to deal better with my pain. **1 2 3 4 5**

16. Everybody I speak with tells me that I have to learn to live with my pain, but I don't see why I should have to. **1 2 3 4 5**

17. I have incorporated strategies for dealing with my pain into my everyday life. **1 2 3 4 5**

18. I have made a lot of progress in coping with my pain. **1 2 3 4 5**

19. I have recently come to the conclusion that it's time for me to change how I cope with my pain. **1 2 3 4 5**

20. I'm getting help learning some strategies for coping better with my pain. **1 2 3 4 5**

21. I'm starting to wonder whether it's up to me to manage my pain rather than relying on physicians. **1 2 3 4 5**

22. I still think despite what doctors tell me, there must be some surgical procedure or medication that would get rid of my pain. **1 2 3 4 5**

23. I have been thinking that doctors can only help so much in managing my pain and that the rest is up to me. **1 2 3 4 5**

24. The best thing I can do is find a doctor who can figure out how to get rid of my pain for once and for all. **1 2 3 4 5**

25. Why can't someone just do something to take away my pain? **1 2 3 4 5**

26. I am learning to help myself control my pain without doctors. **1 2 3 4 5**

27. I am testing out some coping skills to manage my pain better. **1 2 3 4 5**

28. I have been wondering if there is something I could do to manage my pain better. **1 2 3 4 5**

29. All of this talk about how to cope better is a waste of time **1 2 3 4 5**

30. I am learning ways to control my pain other than with medications or surgery. **1 2 3 4 5**

PHYSIOTHERAPY ASSESSMENT

NAME:

.....

PRE - DATE:..... **POST - DATE.....**

	PRE	POST
Walk in 5 minutes **Pre** **Post** A – Easy A B – Minimum B C – Moderate C D – Severe D E – Extreme E	**Distance (Metres)** **Total** ☐ **Comments:**	**Distance (Metres)** **Total** ☐ **Comments:**
Sit – Stands in 2 minutes **Pre** **Post** A – Easy A B – Minimum B C – Moderate C D – Severe D E – Extreme E	**Comments:** **Total** ☐	**Comments** **Total** ☐
On/Off Floor **Pre** **Post** **A – Easy** **A** B – Minimum B C – Moderate C D – Extreme D E – Severe E	**Comments:**	**Comments:**

PAIN QUESTIONNAIRE (R & M SIP)

Name..... Date.....

When you are in pain you may find it difficult to do some of the things you normally do.

This list contains some sentences that people have used to describe themselves when they are in pain. When you read them you may find that some stand out because they describe over the past few days you over the past few days including today. As you read the list, think of yourself. When you read a sentence that describes you put a tick against it. If the sentence does not describe you then leave the space blank and move onto the next one. Remember only to tick the sentence if you are sure that it describes how you have been recently.

1. I stay at home most of the time because of my pain.
2. I change position frequently to try and get comfortable.
3. I walk more slowly than usual because of my pain.
4. Because of my pain I am not doing any of the jobs that I usually do around the house.
5. Because of my pain I use a handrail to get upstairs.
6. Because of my pain I lie down to rest more often.
7. Because of my pain I have to hold on to something to get out of an easy chair.
8. Because of my pain I try to get other people to do things for me.
9. I get dressed more slowly than usual because of my pain.
10. I only stand up for short periods of time because of my pain.
11. Because of my pain I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of my pain.
13. I find it difficult to turn over in bed because of my pain.
14. My appetite is not very good because of my pain.
15. I have trouble putting on my socks (stockings/tights) because of my pain.
16. I only walk short distances because of my pain.
17. I sleep less well because of my pain.
18. Because of my pain I get dressed with help from someone else.
19. I sit down for most of the day because of my pain.
20. I avoid heavy jobs around the house because of my pain.
21. Because of my pain I am more irritable and bad tempered with people than usual.
22. Because of my pain I go upstairs more slowly than usual.
23. I stay in bed most of the time because of my pain.
24. I am in pain almost all of the time.

Pain Management Project

TSK Questionnaire

This is a list of phrases which other patients have used to express how they view their condition. Please indicate the extent to which you agree with each statement.

STRONGLY DISAGREE 0 1 2 **STRONGLY AGREE** 3

		Strongly Disagree			Strongly Agree
1)	I'm afraid that I might injure myself if I exercise	0	1	2	3
2)	If I were to try to overcome it, my pain would increase	0	1	2	3
3)	My body is telling me I have something dangerously wrong	0	1	2	3
4]	My pain would probably be relieved if I were to exercise	0	1	2	3
5)	People aren't taking my medical condition seriously enough	0	1	2	3
6)	My accident has put my body at risk for the rest of my life	0	1	2	3
7)	Pain always means I have injured my body	0	1	2	3
8]	Just because something aggravates my pain does not mean it is dangerous	0	1	2	3
9)	I am afraid that I might injure myself accidentally	0	1	2	3
10)	Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening	0	1	2	3
11)	I wouldn't have this much pain if there wasn't something potentially dangerous going on in my body	0	1	2	3
12]	Although my condition is painful, I would be better off if I were physically active	0	1	2	3
13)	Pain lets me know when to stop exercising so that I don't injure myself	0	1	2	3
14)	It's really not safe for a person with a condition like mine to be physically active	0	1	2	3
15)	I can't do all the things normal people do because it's too easy for me to get injured	0	1	2	3
16]	Even though something is causing me a lot of pain, I don't think it's actually dangerous	0	1	2	3
17)	No one should have to exercise when he/she is in pain	0	1	2	3

YSQ - S1

Name _____ Date_____

INSTRUCTIONS:
Listed below are statements that a person might use to describe himself or herself. Please read each statement and decide how well it describes you. When there you are not sure, base your answer on what you emotionally **feel**, not on what you **think** to be true. Choose the **highest rating from 1 to 6** that describes you and write the number in the space before the statement.

RATING SCALE:
1 = Completely untrue of me
2 = Mostly untrue of me
3 = Slightly more true than untrue
4 = Moderately true of me
5 = Mostly true of me
6 = Describes me perfectly

1. _____ Most of the time, I haven't had someone to nurture me, share him/herself with me, or care deeply about everything that happens to me.

2. _____ In general, people have not been there to give me warmth, holding, and affection.

3. _____ For much of my life, I haven't felt that I am special to someone.

4. _____ For the most part, I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings.

5. _____ I have rarely had a strong person to give me sound advice or direction when I'm not sure what to do.

6. _____ I find myself clinging to people I'm close to, because I'm afraid they'll leave me.

7._____I need other people so much that I worry about losing them.

8. _____ I worry that people I feel close to will leave me or abandon me.

9. _____ When I feel someone I care for pulling away from me, I get desperate.

10. _____ Sometimes I am so worried about people leaving me that I drive them away.

11. _____ I feel that people will take advantage of me.

12._____I feel that I cannot let my guard down in the presence of other people, or else they will intentionally hurt me.

13._____It is only a matter of time before someone betrays me.

14. _____ I am quite suspicious of other people's motives.

15. _____ I'm usually on the lookout for people's ulterior motives.

16. _____ I don't fit in.

17. _____ I'm fundamentally different from other people.

18. _____ I don't belong; I'm a loner.

19. _____ I feel alienated from other people.

20. _____ I always feel on the outside of groups.

21. _____ No man/woman I desire could love me one he/she saw my defects.

22. _____ No one I desire would want to stay close to me if he/she knew the real me.

23. _____ I'm unworthy of the love, attention, and respect of others.

24. _____ I feel that I'm not loveable.

25. _____ I am too unacceptable in very basic ways to reveal myself to other people. *ds

26. _____ Almost nothing I do at work (or school) is as good as other people can do.

27. _____ I'm incompetent when it comes to achievement.

28. _____ Most other people are more capable than I am in areas of work and achievement.

29. _____ I'm not as talented as most people are at their work.

30. _____ I'm not as intelligent as most people when it comes to work (or school).

31. _____ I do not feel capable of getting by on my own in everyday life.

32. _____ I think of myself as a dependent person, when it comes to everyday functioning.

33. _____ I lack common sense.

34. _____ My judgement cannot be relied upon in everyday situations.

35. _____ I don't feel confident about my ability to solve everyday problems that come up.

36. _____ I can't seem to escape the feeling that something bad is about to happen.

37. _____ I feel that a disaster (natural, criminal, financial, or medical) could strike at any moment.

38. _____ I worry about being attacked.

39. _____ I worry that I'll lose all my money and become destitute.

40. _____ I worry that I'm developing a serious illness, even though nothing serious has been diagnosed by a physician.

41. _____I have not been able to separate myself from my parent(s), the way other people my age seem to.

42. _____ My parent(s) and I tend to be over-involved in each other's lives and problems.

43. _____ It is very difficult for my parent(s) and me to keep intimate details from each other, without feeling betrayed or guilty.

44. _____ I often feel as if my parent(s) are living through me--I don't have a life of my own.

45. _____I often feel that I do not have a separate identity from my parent(s) or partner.

46. _____ I think that if I do what I want, I'm only asking for trouble.

47. _____ I feel that I have no choice but to give in to other people's wishes, or else they will retaliate or reject me in some way.

48. _____ In relationships, I let the other person have the upper hand.

49. _____ I've always let others make choices for me, so I really don't know what I want for myself.

50. _____ I have a lot of trouble demanding that my rights be respected and that my feelings be taken into account.

51. _____ I'm the one who usually ends up taking care of the people I'm close to.

52. _____ I am a good person because I think of others more than of myself.

53. _____ I'm so busy doing for the people that I care about, that I have little time for myself.

54. _____ I've always been the one who listens to everyone else's problems.

55. _____ Other people see me as doing too much for others and not enough for myself.

56. _____ I am too self-conscious to show positive feelings to others (e.g., affection, showing I care).

57. _____ I find it embarrassing to express my feelings to others.

58. _____ I find it hard to be warm and spontaneous.

59. _____ I control myself so much that people think I am unemotional.

60. _____ People see me as uptight emotionally.

61. _____ I must be the best at most of what I do; I can't accept second best.

62. _____ I try to do my best; I can't settle for "good enough."

63. _____ I must meet all my responsibilities.

64. _____ I feel there is constant pressure for me to achieve and get things done.

65. _____ I can't let myself off the hook easily or make excuses for my mistakes.

66. _____ I have a lot of trouble accepting "no" for an answer when I want something from other people.

67. _____ I'm special and shouldn't have to accept many of the restrictions placed on other people.

68. _____ I hate to be constrained or kept from doing what I want.

69. _____ I feel that I shouldn't have to follow the normal rules and conventions other people do.

70. _____ I feel that what I have to offer is of greater value than the contributions of others.

71. _____ I can't seem to discipline myself to complete routine or boring tasks.

72. _____ If I can't reach a goal, I become easily frustrated and give up.

73. _____ I have a very difficult time sacrificing immediate gratification to achieve a long-range goal.

74. _____ I can't force myself to do things I don't enjoy, even when I know it's for my own good.

75. _____ I have rarely been able to stick to my resolutions.

YSQ - S1

Name
_____Date_____

INSTRUCTIONS:
Listed below are statements that a person might use to describe himself or herself. Please read each statement and decide how well it describes the person who gave you this form. When there you are not sure, base your answer on what you emotionally **feel**, not on what you **think** to be true of them. Choose the **highest rating from 1 to 6** that describes the person that gave you this form and write the number in the space before the statement. Remember, you are filling in this questionnaire **as if** you were the person who gave you this form.

RATING SCALE:
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74. _____ I can't force myself to do things I don't enjoy, even when I know it's for my own good.

75. _____ I have rarely been able to stick to my resolutions.

Instructions. Read each of the statements carefully and for each one circle the number that best describes the person you are rating

1. This person has an expectation that their needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect will not be met in a predictable manner.

very much so	somewhat	a little	not at all	don't know
1	2	3	4	9

2. This person feels that they cannot manage on their own, that they will fail if they try, and feel that something awful is likely to happen to them at any moment.

very much so	somewhat	a little	not at all	don't know
1	2	3	4	9

3. This person feels a sense of superiority, entitlement and has a belief that they should be able to do what they want regardless of what is realistic or reasonable. May also have a difficulty exercising self-control and is likely not to tolerate frustrations easily.

very much so	somewhat	a little	not at all	don't know
1	2	3	4	9

4. This person has an excessive focus on the desires, feelings, and responses of others, at the expense of their own needs – in order to gain love and approval, to maintain their sense of connection or to avoid retaliation. This person may also show a lack of awareness, or suppression of, their anger.

very much so	somewhat	a little	not at all	don't know
1	2	3	4	9

5. This person has an excessive emphasis on controlling their own spontaneous feelings, impulses, and choices in order to avoid making mistakes OR on meeting rigid, internalised rules and expectations about performance and ethical behaviour – often at the expense of happiness, self-expression, relaxation, close relationships or health.

very much so	somewhat	a little	not at all	don't know
1	2	3	4	9

Outcome rating

Instructions: Please give a rating on the scale below indicating what you consider to be the likely outcome from the pain management programme for this individual.

very poor outcome					very good outcome
1	2	3	4	5	6

DAS-24

This scale lists different attitudes or beliefs which people sometimes hold. Please read each statement carefully and decide how much you agree or disagree with what it says.

For each of the attitudes, please indicate you answer by placing a tick (✓) under the column that best describes how you think. Be sure to choose only one answer for each attitude. But please note that because people are different, there is no right or wrong answer to these statements.

To decide whether a given answer is typical of your way of looking at things, simply keep in mind what you are like most of the time.

Attitudes	totally agree	agree very much	agree slightly	neutral	disagree slightly	disagree very much	totally disagree
1. If I fail partly, it is as bad as being a complete failure							
2. If others dislike you, you cannot be happy							
3. I should be happy all the time							
4. People will probably think less of me if I make a mistake							
5. My happiness depends more on other people than it does on me							
6. I should always have complete control over my feelings							
7. My life is wasted unless I am a success							
8. What other people think of me is very important							
9. I ought to be able to solve my problems quickly and without a great deal of effort							
10. If I don't set the highest standards for myself I am likely to end up a second rate person							
11. I am nothing if a person I love doesn't love me							

Attitudes	totally agree	agree very much	agree slightly	neutral	disagree slightly	disagree very much	totally disagree
2. A person should be ble to control what appens to him/her							
3. If I am to be a orthwhile person, I must e truly outstanding in at east one major respect							
4. If you don't have thers to lean on, you are ound to be sad							
5. It is possible for a erson to be scolded and ot get upset							
6. I must be a useful, roductive, creative erson or life has no urpose							
7. I can find happiness ithout being loved by nother person							
8. A person should do ell at everything he/she ndertakes							
9. If I do not do well all e time, people will not spect me							
0. I do not need the pproval of others in order be happy							
1. If I try hard enough, I hould be able to excel at verything I attempt							
2. People who have good eas are more worthy an those who do not							
3. A person doesn't need be well liked in order to e happy							
4. Whenever I take a ance or risk I am only oking for trouble							

Thank you for filling in this questionnaire

«Title» «FirstName» «LastName»
«Address1»
«Address2»
«City»
«PostalCode»

4 January 2001

Dear «Title» «LastName»

I am writing to invite you to join a research study that is being undertaken in connection with the Lothian Chronic Pain Service, based in the Clinical Psychology Department at the Astley Ainslie Hospital. The attached Information sheet explains what the project is about. Please read this sheet carefully and if you are interested in taking part please remember to complete the consent form. It is very important to the success of the research project that as many people as possible take part. Therefore, I would ask that you do take part if you possibly can.

Thank you,

Martin Dunbar
Trainee Clinical Psychologist

Information sheet and consent form for main study participants (PMP patients)

PATIENT INFORMATION SHEET
for a study into how thinking affects pain management

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends, relatives and your GP if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Consumers for Ethics in Research (CERES) publish a leaflet entitled 'Medical Research and You'. This leaflet gives more information about medical research and looks at some questions you may want to ask. A copy may be obtained from CERES, PO Box 1365, London N16 0BW.

Thank you for reading this.

What is the purpose of the study?

It is accepted by many people that the way that we think can affect the level of pain we experience, how we cope with it and how fed up pain can make us feel. Indeed, the pain management programme that you are about to start has two sessions on thinking and how thoughts can affect mood and activity. It's obviously true that different people look at things in different ways. For example, some see life as a challenge, others see it as a series of hurdles. This study is an attempt to look at these kinds of different styles of thinking and how they might be related to the benefits that people get out of pain management.

This piece of research will be running for a six month period between January and July 2001. However, if you choose to take part your personal involvement will only be very brief.

Why have I been chosen?

You have been chosen because you are about to start the pain management programme at the Astley Ainslie Hospital. All patients between January and July 2001 will be invited to take part in this study. Approximately 80 people will be taking part.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. This will not affect the standard of care you receive.

What will I be asked to do if I take part?

If you decide to take part in this study all you need to do is fill out the two questionnaires that accompany this letter and bring them with you when you start the pain management programme. You will also be asked to give a copy of one of the questionnaires (the one labelled YSQ-SF) to a friend or family member who knows you really well. They will be asked to fill in the questionnaire as if they were you. The reason they are asked to do this is because we are interested in whether a person's family or friends see them in the same way that a person sees themselves. If you agree to do this you will find this questionnaire in the envelope labelled 'friend or family member' along with a letter addressed to them explaining what they would be asked to do. We would also ask you not to discuss how you filled in the questionnaire with them, otherwise it defeats the purpose of getting someone else to fill it in. One thing that should be made very clear is that your answers and the answers given by your friend or family member are completely confidential. That is, no one apart from the researcher will know what answers you have given.

What are the possible disadvantages and risks of taking part?

The only disadvantage of taking part will be the time taken to fill in the questionnaires.

What are the possible benefits of taking part?

There will be no benefit to you personally from taking part. Hopefully, the information that you provide will enable more effective pain management programmes to be developed in the future.

What happens when the research study stops?

Once you have completed these questionnaires, and asked your friend or family member to complete the questionnaire that they were asked to do, then your involvement with the project would stop. However, if you would like to have some feedback on the outcome of the study then you could tell the person leading the group that you are in to contact me and I would send you the information when the study was completed. The feedback, however, will just be general and would not be specifically about you.

What if something goes wrong?

if you wish to complain about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms are available to you.

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the hospital/surgery will have your name and address removed so that you cannot be recognised from it.

The consultant who is responsible for your care will be notified of your participation in this study. Your GP will not be notified.

What will happen to the results of the research study?

This study is being conducted as part of the degree of Doctor of Clinical Psychology with the University of Edinburgh. As a result it will be written up as a thesis and submitted for examination. It is also likely that the study will be written up and submitted to a scientific journal for publication. If it were to be published it would occur within twelve months of the study being completed and you would be able to access a copy of the completed article through the National Library.

Who is organising and funding the research?

This study is organised with assistance from Edinburgh University's Department of Clinical Psychology and the Clinical Psychology service at the Astley Ainslie Hospital.

Who has reviewed the study?

This study has been considered by the Research Ethics Committee for Lothian region.

Contact for Further Information

If you require any further information regarding this project, or if you have any questions about it, you can contact:

Martin Dunbar
Trainee Clinical Psychologist
Department of Clinical Psychology
Astley Ainslie Hospital
Edinburgh
Tel: 0131 537 9130

Local independent adviser

You can also contact an independent psychologist who has agreed to give you impartial advice about the study. Her name is:

Gabby Wynne
Counselling Psychologist
Department of Clinical Psychology
Astley Ainslie Hospital
Edinburgh
Tel: 0131 537 9148

This Patient Information Sheet is yours to keep. If you agree to participate you will be asked to complete a consent form, a copy of which will also be given to you to keep.

Patient Identification Number:

CONSENT FORM

Title of Project: How thinking affects pain management

Name of Researcher: Martin Dunbar

Please initial box

1. I confirm that I have read and understand the information sheet dated 26 November 2000 for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that sections of any of my medical notes may be looked at by Martin Dunbar, where it is relevant to my taking part in this research. I give permission for him to have access to my records. ☐

4. I agree to take part in the above study. ☐

Name of Patient	Date	Signature
Name of Person taking consent (if different from researcher)	Date	Signature
Researcher	Date	Signature

1 for patient; 1 for researcher; 1 to be kept with hospital notes

Information sheet and consent form for friend/relative of participants (PMP patients)

INFORMATION SHEET

for a study into how thinking affects pain management

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends, relatives and your GP if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

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Thank you for reading this.

What is the purpose of the study?

It is accepted by many people that the way that we think can affect the level of pain we experience, how we cope with it and how fed up pain can make us feel. Indeed, the pain management programme that your friend or relative is about to start has two sessions on thinking and how thoughts can affect mood and activity. It's obviously true that different people look at things in different ways. For example, some see life as a challenge others see it as a series of hurdles. This study is an attempt to look at these kinds of different styles of thinking and how they might be related to the benefits that people get out of pain management.

This piece of research will be running for a six month period between January and July 2001. However, if you choose to take part your personal involvement will only be very brief.

Why have I been chosen?

You have been chosen because the friend or relative who gave you this form and the attached questionnaire is about to start the pain management programme at the Astley Ainslie Hospital. All pain management programme patients who are starting treatment between January and July 2001 will be invited to take part in this study and each one of them has been asked to nominate a friend or relative to fill in a questionnaire. Approximately 80 people will be taking part. It is important that you understand that the questionnaire that you are being asked to complete is about your friend or relative and that they, not you, are the focus of this study.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. This will not affect the standard of care that your friend or relative receives.

What will I be asked to do if I take part?

If you decide to take part in this study all you need to do is fill out the questionnaire (titled YSQ-SF) and the consent form that accompanies this letter and post them back to me (Martin Dunbar) in the pre-paid envelope that you will find with this letter. You are asked to fill in the questionnaire as if you were the person who gave you it. The reason you are asked to do this is because we are interested in whether a person's family or friends see them in the same way that a person sees themselves. We would also ask you not to discuss how you filled in the questionnaire with the person who gave you the questionnaire, otherwise it defeats the purpose of getting someone else to fill it in. One thing that should be made very clear is that your answers are completely confidential. That is, no one apart from the researcher will know what answers you have given.

What are the possible disadvantages and risks of taking part?

The only disadvantage of taking part will be the time taken to fill in the questionnaires.

What are the possible benefits of taking part?

There will be no benefit to yourself or to the person who gave you this questionnaire from your taking part. Hopefully, the information that you provide will enable more effective pain management programmes to be developed in the future.

What happens when the research study stops?

Once you have completed this questionnaire and returned it to us your involvement with the project would stop. However, if you would like to have some feedback on the outcome of the study then you could write to me at the address below and I would send you the information when the study was completed. The feedback, however, will just be general and would not be specifically about you or your friend/relative.

What if something goes wrong?

if you wish to complain about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms are available to you.

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you will have your name and address removed so that you cannot be recognised from it.

What will happen to the results of the research study?

This study is being conducted as part of the degree of Doctor of Clinical Psychology with the University of Edinburgh. As a result it will be written up as a thesis and submitted for examination. It is also likely that the study will be written up and submitted to a scientific journal for publication. If it were to be published it would occur within twelve months of the study being completed and you would be able to access a copy of the completed article through the National Library.

Who is organising and funding the research?

This study is organised with assistance from Edinburgh University's Department of Clinical Psychology and the Clinical Psychology service at the Astley Ainslie Hospital.

Who has reviewed the study?

This study has been considered by the Research Ethics Committee for Lothian region.

Contact for Further Information

If you require any further information regarding this project, or if you have any questions about it, you can contact:

Martin Dunbar
Trainee Clinical Psychologist
Department of Clinical Psychology
Astley Ainslie Hospital
Edinburgh
Tel: 0131 537 9140

Local independent adviser

You can also contact an independent psychologist who has agreed to give you impartial advice about the study. Her name is:

Gabby Wynne
Counselling Psychologist
Department of Clinical Psychology
Astley Ainslie Hospital
Edinburgh
Tel: 0131 537 9140

This Information Sheet is yours to keep. If you agree to participate you will be asked to complete a consent form, a copy of which will also be given to you to keep.

Patient Identification Number:

CONSENT FORM

Title of Project: How thinking affects pain management

Name of Researcher: Martin Dunbar

Please initial box

1. I confirm that I have read and understand the information sheet dated 26 November 2000 for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study. ☐

4. I understand that the research gathered for this study is about my friend/relative and not about me. ☐

Your Name	Date	Signature

Your Address

Name of Person taking consent (if different from researcher)	Date	Signature

Researcher	Date	Signature

1 for participant; 1 for researcher

«Title» «FirstName» «LastName»
«Address1»
«Address2»
«City»
«PostalCode»

1 May 2001

Dear «Title»«LastName»

As you will recall, I wrote to you just as you were about to start the Pain Management Programme at the Astley Ainslie Hospital. At that time I invited you to join a research study that is being undertaken in connection with the Lothian Chronic Pain Service. I note from my records that you have not yet returned the questionnaires that I sent to you. Of course, this may be because you have decided not to take part in the study, and if this is the case, then please accept my apologies for bothering you. On the other hand, you may have simply forgotten to return the questionnaires. In which case I would request that you do so as soon as possible as it is very important to the success of the study that most group member take part. I have also enclosed new copies of the questionnaires in case these have been mislaid since I first wrote to you.

Thank you for taking the time to read this and I hope that you are able to take part in the study.

Yours sincerely,

Martin Dunbar
Trainee Clinical Psychologist

Appendix XVII-1. Correlation Matrix of all outcome variables

	SE1	BA1	BD1	PC1	C1	A1	M1	W1	S1	SIP1	TK1	P2	SE2	BA2	BD2	PC2	C2
P1	0.23	0.43**	0.23	-0.06	0.02	0.08	-0.17	-0.14	-0.02	0.39**	-0.08	0.39*	-0.16	0.31	0.32*	0.22	0.03
	(59)	(58)	(58)	(55)	(57)	(55)	(55)	(57)	(57)	(59)	(58)	(38)	(38)	(38)	(38)	(37)	(37)
SE1	1	-0.39**	-0.47**	-0.14	0.25	0.27*	0.56**	0.32	0.39**	-0.42**	-0.24	-0.40*	0.57**	-0.43**	-0.55**	-0.25	0.09
		(58)	(58)	(55)	(57)	(55)	(55)	(57)	(57)	(59)	(58)	(38)	(38)	(38)	(38)	(37)	(37)
BA1		1	0.62**	0.22	-0.07	-0.12	-0.36**	-0.22	-0.00	0.39**	0.23	0.43**	-0.32	0.76**	0.62**	0.23	-0.09
			(58)	(55)	(57)	(55)	(55)	(56)	(56)	(58)	(58)	(37)	(37)	(37)	(37)	(36)	(36)
BD1			1	0.38**	-0.05	-0.12	-0.35	-0.24	-0.14	0.44**	0.32*	0.37*	-0.51	0.66**	0.75**	0.19	-0.02
				(55)	(57)	(55)	(55)	(56)	(56)	(58)	(58)	(37)	(37)	(37)	(37)	(36)	(36)
PC1				1	-0.08	-0.42**	-0.44**	0.09	0.09	0.01	0.57**	0.45**	-0.39*	0.44**	0.41*	0.75**	-0.10
					(54)	(54)	(54)	(53)	(53)	(55)	(55)	(34)	(34)	(34)	(34)	(34)	(33)
C1					1	0.16	0.27*	0.26	0.25	-0.18	-0.09	-0.07	0.19	0.04	0.02	0.17	0.29
						(55)	(55)	(55)	(55)	(57)	(57)	(36)	(36)	(36)	(36)	(35)	(36)
A1						1	0.84**	0.10	-0.06	0.10	-0.31*	-0.26	0.19	-0.15	-0.11	-0.31	-0.12
							(54)	(53)	(53)	(55)	(55)	(34)	(34)	(34)	(34)	(34)	(34)
M1							1	0.16	0.13	-0.11	-0.32*	-0.54**	0.51*	-0.37*	-0.32	-0.37*	0.04
								(53)	(53)	(55)	(55)	(34)	(34)	(34)	(34)	(33)	(34)

Appendix XVII-2. Correlation Matrix of all outcome variables (continued)

	A2	M2	W2	S2	SIP2	TK2	P-C	SE-C	BA-C	BD-C	PC-C	C-C	A-C	M-C	W-C	S-C	SIP-C	TK-C
P1	-0.08	-0.20	-0.15	-0.13	0.18	-0.03	0.40*	0.21	-0.15	0.10	0.26	-0.08	-0.17	0.16	-0.05	-0.22	-0.22	0.05
	(37)	(37)	(35)	(35)	(38)	(28)	(38)	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(33)	(38)	(37)
SE1	0.34*	0.37*	0.32	0.41*	-0.47**	-0.31	0.21	0.28	-0.21	-0.10	-0.09	0.15	0.19	-0.31	0.29	0.02	-0.02	0.16
	(37)	(37)	(35)	(35)	(38)	(38)	(38)	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(33)	(38)	(37)
BA1	-0.23	-0.33*	0.04	0.03	0.34*	0.36*	-0.10	0.03	-0.33	0.07	0.03	-0.23	-0.21	0.00	0.10	-0.17	0.14	0.23
	(36)	(36)	(34)	(34)	(37)	(37)	(37)	(34)	(33)	(33)	(34)	(36)	(34)	(34)	(31)	(32)	(37)	(37)
BD1	-0.25	-0.40*	-0.16	-0.19	0.46**	0.26	-0.15	-0.40*	0.04	-0.18	0.01	-0.14	-0.14	0.09	0.16	-0.03	0.10	0.07
	(36)	(36)	(34)	(34)	(37)	(37)	(37)	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(31)	(32)	(37)	(37)
PC1	-0.55**	-0.45**	-0.43*	0.06	0.19	-0.31	-0.48**	-0.37	0.26	0.45*	-0.14	-0.05	0.08	0.25	-0.21	-0.04	0.33	0.21
	(33)	(33)	(31)	(31)	(34)	(34)	(34)	(26)	(30)	(34)	(34)	(33)	(33)	(32)	(28)	(29)	(34)	(34)
C1	0.27	0.24	0.20	0.22	-0.24	-0.13	0.20	0.01	-0.38*	-0.19	0.25	-0.52**	0.39*	0.28	-0.37*	0.02	-0.24	-0.13
	(36)	(36)	(33)	(33)	(36)	(36)	(36)	(28)	(32)	(32)	(33)	(36)	(34)	(34)	(30)	(31)	(36)	(36)
A1	0.26	0.41*	0.33	-0.11	0.00	-0.44**	0.40*	0.55**	-0.29	-0.28	0.15	0.05	-0.75**	-0.54**	0.15	-0.03	-0.27	0.10
	(34)	(34)	(31)	(31)	(34)	(34)	(34)	(27)	(30)	(30)	(33)	(34)	(34)	(33)	(28)	(29)	(34)	(34)
M1	0.49**	0.64**	0.41*	0.15	-0.26	-0.46**	0.42*	0.50**	-0.22	-0.19	0.08	0.07	-0.38*	-0.74**	0.35	0.00	-0.28	0.14
	(34)	(34)	(31)	(31)	(34)	(34)	(34)	(27)	(30)	(30)	(32)	(34)	(33)	(34)	(28)	(29)	(34)	(34)

Appendix XVII-3. Correlation Matrix of all outcome variables (continued)

	S1	SIP1	TK1	P2	SE2	BA2	BD2	PC2	C2	A2	M2	W2	S2	SIP2	TK2	P-C	SE-C
W1	0.46**	-0.37**	-0.04	-0.40*	-0.46**	-0.40*	-0.55**	-0.35*	0.23	-0.43**	-0.46**	0.88**	0.31	-0.43**	-0.32	0.24	0.25
	(59)	(57)	(56)	(36)	(36)	(36)	(36)	(35)	(35)	(35)	(35)	(35)	(35)	(36)	(36)	(36)	(26)
S1	1	-0.50**	-0.24	-0.27	0.33*	-0.23	-0.28	-0.01	0.10	0.11	0.19	0.35*	0.68**	0.77**	0.25	-0.01	-0.24
		(57)	(56)	(36)	(36)	(36)	(36)	(35)	(35)	(35)	(35)	(35)	(35)	(38)	(38)	(38)	(28)
SIP1		1	0.44**	0.29	-0.49**	0.45**	0.53**	0.13	-0.10	-0.15	-0.24	-0.15	-0.46**	0.76**	0.62**	0.23	-0.09
			(58)	(38)	(38)	(38)	(38)	(37)	(37)	(37)	(37)	(35)	(35)	(37)	(37)	(36)	(36)
TK1			1	0.35*	-0.57**	0.48**	0.37*	0.36*	-0.08	-0.38*	-0.41*	-0.11	-0.22	0.56**	0.79**	-0.42**	-0.61**
				(37)	(37)	(37)	(37)	(36)	(36)	(36)	(36)	(34)	(34)	(37)	(37)	(37)	(28)
P2				1	-0.59**	0.64**	0.66**	0.58**	-0.23	-0.43**	-0.57**	-0.40*	-0.40*	0.54**	0.43**	-0.68**	-0.42*
					(38)	(38)	(38)	(37)	(37)	(37)	(37)	(34)	(34)	(38)	(38)	(38)	(28)
SE2					1	-0.45**	-0.68**	-0.42**	0.28	0.60**	0.62**	0.41*	0.40*	-0.70**	-0.55**	0.46**	0.74**
						(38)	(38)	(37)	(37)	(37)	(37)	(34)	(34)	(38)	(38)	(38)	(28)
BA2						1	0.83**	0.44**	-0.11	0.30	-0.43**	-0.32	-0.32	0.56**	0.64**	-0.40*	-0.37
							(38)	(37)	(37)	(37)	(37)	(34)	(34)	(38)	(38)	(38)	(28)
BD2							1	0.54**	-0.20	-0.45**	-0.51**	-0.43*	-0.33	0.69**	0.56**	-0.40*	-0.55**
								(37)	(37)	(37)	(37)	(34)	(34)	(38)	(38)	(38)	(28)

Appendix XVII-4. Correlation Matrix of all outcome variables (continued)

	BA-C	BD-C	PC-C	C-C	A-C	M-C	W-C	S-C	SIP-C	TK-C
W1	-0.50**	-0.38*	-0.03	-0.03	0.05	-0.08	-0.11	0.19	-0.28	-0.19
	(31)	(31)	(32)	(34)	(32)	(32)	(32)	(33)	(36)	(35)
S1	-0.42*	-0.23	0.02	-0.16	0.02	-0.32	0.22	0.06	-0.06	0.20
	(31)	(31)	(32)	(34)	(32)	(32)	(32)	(33)	(36)	(35)
SIP1	0.26	0.16	0.10	0.05	-0.21	0.06	-0.15	-0.15	-0.19	-0.37*
	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(33)	(38)	(37)
TK1	0.38*	0.34*	0.02	-0.04	0.22	0.34*	-0.14	-0.23	0.27	-0.37*
	(33)	(33)	(34)	(36)	(34)	(34)	(31)	(32)	(37)	(37)
P2	0.36*	0.48**	0.32	-0.08	-0.02	0.22	-0.18	-0.21	0.44**	0.06
	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)	(38)	(37)
SE2	-0.21	-0.36*	-0.15	0.06	0.23	-0.15	0.16	0.28	-0.42**	0.10
	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)	(38)	(37)
BA2	0.36*	0.36*	0.11	-0.09	-0.03	0.13	0.11	-0.16	0.24	0.19
	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)	(38)	(37)
BD2	0.33	0.54**	0.24	-0.14	-0.17	0.01	0.15	-0.18	0.34*	0.25
	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)	(38)	(37)

Appendix XVII-5. Correlation Matrix of all outcome variables (continued)

	C2	A2	M2	W2	S2	SIP2	TK2	P-C	SE-C	BA-C	BD-C	PC-C	C-C	A-C	M-C	W-C	S-C
PC2	-0.36*	-0.55**	-0.37*	-0.33	-0.16	0.33*	0.58**	-0.40*	-0.32	0.28	0.61**	0.54**	-0.42*	-0.07	0.15	-0.32	-0.25
	(36)	(36)	(36)	(33)	(33)	(37)	(37)	(37)	(27)	(32)	(32)	(34)	(35)	(34)	(33)	(31)	(31)
C2	1	0.56***	0.36*	0.24	0.15	0.19	-0.26	0.20	-0.02	-0.00	-0.24	-0.30	0.67**	0.46**	0.22	-0.01	0.28
		(37)	(37)	(33)	(33)	(37)	(37)	(37)	(28)	(32)	(32)	(33)	(36)	(34)	(34)	(31)	(31)
A2		1	0.86**	0.44*	0.13	-0.43**	-0.47**	0.35*	0.43*	-0.07	-0.48**	-0.04	0.27	0.45**	0.11	0.10	0.17
			(37)	(33)	(33)	(37)	(37)	(37)	(28)	(32)	(32)	(33)	(36)	(34)	(34)	(31)	(31)
M2			1	0.43*	0.21	-0.44**	-0.42**	0.40*	0.51**	-0.11	-0.36*	0.09	0.06	0.20	0.04	0.01	0.16
				(33)	(33)	(37)	(37)	(37)	(28)	(32)	(32)	(33)	(36)	(34)	(34)	(31)	(31)
W2				1	0.33*	-0.36*	-0.28	-0.27	0.27	-0.49**	-0.35	0.06	-0.04	0.00	-0.21	0.22	0.20
					(36)	(34)	(34)	(34)	(24)	(29)	(29)	(30)	(32)	(30)	(30)	(32)	(33)
S2					1	-0.58**	-0.30	0.27	0.27	-0.47**	-0.28	-0.32	-0.09	0.16	-0.06	0.29	0.61**
						(34)	(34)	(34)	(24)	(29)	(29)	(30)	(32)	(30)	(30)	(32)	(33)
SIP2						1	0.48**	-0.40*	-0.55**	0.32	0.40*	0.23	0.06	-0.19	0.01	0.03	-0.29
							(38)	(38)	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(33)
TK2							1	-0.45**	-0.53**	0.37	0.50**	0.16	-0.09	0.11	0.23	0.01	-0.29
								(38)	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)

Appendix XVII-6. Correlation Matrix of all outcome variables (continued)

	SIP-C	TK-C
PC2	0.33*	0.28
	(37)	(36)
C2	-0.17	-0.20
	(37)	(36)
A2	-0.34*	-0.10
	(37)	(36)
M2	-0.37*	0.04
	(36)	(36)
W2	-0.40*	-0.21
	(34)	(33)
S2	-0.26	0.03
	(34)	(33)
SIP2	0.47**	-0.18
	(38)	(37)
TK2	0.40*	0.27
	(38)	(37)

	SE-C	BA-C	BD-C	PC-C	C-C	A-C	M-C	W-C	S-C	SIP-C	TK-C
P-C	0.53**	-0.43*	-0.38*	-0.11	0.01	-0.11	-0.10	0.13	0.03	-0.61**	-0.02
	(28)	(33)	(33)	(34)	(36)	(34)	(34)	(32)	(32)	(38)	(37)
SE-C	1	-0.24	-0.39*	-0.03	-0.02	-0.29	-0.23	0.01	-0.03	-0.57**	0.12
		(26)	(26)	(26)	(28)	(27)	(27)	(23)	(22)	(28)	(28)
BA-C		1	0.42**	0.12	0.26	0.23	0.19	0.06	0.08	0.13	-0.03
			(33)	(30)	(32)	(30)	(30)	(28)	(27)	(33)	(33)
BD-C			1	0.35	-0.06	-0.06	-0.07	-0.04	-0.26	0.41*	0.24
				(30)	(32)	(30)	(30)	(28)	(27)	(33)	(33)
PC-C				1	-0.48**	-0.17	-0.03	-0.29	-0.36	0.22	0.20
					(33)	(33)	(32)	(28)	(28)	(34)	(34)
C-C					1	0.10	-0.02	0.29	0.20	0.03	-0.08
						(34)	(34)	(30)	(30)	(36)	(36)
A-C						1	0.62**	-0.08	0.13	-0.03	-0.18
							(33)	(28)	(28)	(34)	(34)
M-C							1	-0.45*	0.08	-0.06	-0.18
								(28)	(28)	(34)	(34)

Appendix XVII. Correlation Matrix of all outcome variables (continued).

	S-C	SIP-C	TK-C
W-C	0.30	-0.15	0.24
	(30)	(32)	(31)
S-C	1	-0.27	-0.08
		(32)	(31)
SIP-C		1	0.19
			(37)
TK-C			1

Key: 1 = collected at time 1, 2 - collected at time 2, -C = change between time 1 and 2.

P = pain intensity; SE = self-efficacy; BA = BAI; BD = BDI-II; PC= PSCQ-PC; C = PSCQ-C; A = PSCQ-A; M = PSCQ-M; W = metres walked in 2 mins.; S = number of sit-to-stands in 2 mins.; SIP = SIP-SF; TK = TSK.

Table XVIII. Correlation matrix of all the schema variables

	S-DR	S-IA	S-IL	S-OD	S-OI	I-DR	I-IA	I-IL	I-OD	I-OI	P-DR	P-IA	P-IL	P-OD	P-OI	DA-A	DA-D	DA-S
S-DR	1	0.72**	0.36*	0.61**	0.63**	**0.47***	0.08	0.18	-0.23	0.08	**0.28**	0.23	-0.12	0.35	0.35	0.08	0.10	0.12
		(31)	(31)	(31)	(31)	**(24)**	(24)	(24)	(24)	(24)	**(26)**	(26)	(26)	(26)	(26)	(31)	(31)	(31)
S-IA		1	0.44*	0.43*	0.39*	-0.01	**0.13**	0.25	-0.24	-0.05	0.29	**0.23**	-0.14	0.51**	0.38	0.14	***0.23***	0.14
			(31)	(31)	(31)	(24)	**(24)**	(24)	(24)	(24)	(26)	**(26)**	(24)	(24)	(24)	(31)	***(24)***	(24)
S-IL			1	0.01	0.22	-0.05	-0.19	**0.09**	-0.15	-0.05	-0.09	-0.12	**-0.07**	-0.06	0.03	0.13	0.09	0.24
				(31)	(31)	(24)	(24)	**(24)**	(24)	(24)	(26)	(26)	**(26)**	(26)	(26)	(31)	(31)	(31)
S-OD				1	0.26	0.35	0.09	0.36	**0.18**	-0.07	0.08	-0.00	-0.09	**0.36**	0.35	0.13	0.25	0.06
					(31)	(24)	(24)	(24)	**(24)**	(24)	(26)	(26)	(26)	**(26)**	(26)	(31)	(31)	(31)
S-OI					1	0.28	-0.16	-0.22	-0.40	**0.15**	0.15	0.22	-0.20	0.15	**0.62****	***0.30***	0.17	0.21
						(24)	(24)	(24)	(24)	**(24)**	(26)	(26)	(26)	(26)	**(26)**	***(31)***	(31)	(31)
I-DR						1	0.54**	0.27	0.39*	0.41*	**-0.17**	-0.17	-0.02	0.07	-0.13	-0.25	-0.25	0.03
							(24)	(24)	(24)	(24)	**(22)**	(22)	(22)	(22)	(22)	(24)	(24)	(24)
I-IA							1	0.50*	0.67**	0.41*	0.01	**0.21**	-0.04	0.37	0.10	-0.34	***-0.06***	-0.28
								(24)	(24)	(24)	(22)	**(22)**	(22)	(22)	(22)	(24)	***(24)***	(24)
I-IL								1	0.43*	0.28	0.12	0.10	**0.02**	0.31	-0.01	0.03	-0.00	-0.18
									(24)	(24)	(22)	(22)	**(22)**	(22)	(22)	(24)	(24)	(24)

Table XVIII Correlation matrix of all the schema variables (continued)

	I-OD	I-OI	P-DR	P-IA	P-IL	P-OD	P-OI	DA-A	DA-D	DA-S
I-OD	1	0.17	-0.04	-0.02	-0.03	**0.06**	0.14	-0.28	-0.05	-0.38
		(24)	(22)	(22)	(22)	**(22)**	(22)	(24)	(24)	(24)
I-OI		1	-0.57*	-0.01	-0.08	-0.03	**0.13**	***-0.12***	-0.17	-0.13
			(22)	(22)	(22)	(22)	**(22)**	***(24)***	(24)	(24)
P-DR			1	0.65**	0.32*	0.33*	0.18	-0.07	0.06	0.07
				(53)	(53)	(53)	(53)	(25)	(25)	(25)
P-IA				1	0.03	0.42*	0.32*	0.09	***0.13***	0.14
					(53)	(53)	(53)	(25)	***(25)***	(25)
P-IL					1	-0.10	-0.20	0.26	0.22	0.10
						(53)	(53)	(25)	(25)	(31)
P-OD						1	0.70**	0.14	-0.04	0.34
							(53)	(25)	(25)	(25)
P-OI							1	***-0.08***	-0.08	0.23
								(25)	(25)	(25)
DA-A								1	0.67**	0.57**
									(31)	(31)
DA-D									1	0.39*
										(31)
DA-S										1